SSR Institute of International Journal of Life Sciences
ISSN (O): 2581-8740 | ISSN (P): 2581-8732
Sethi *et al*., 2026
doi: 10.21276/SSR-IIJLS.2026.12.4.47

Original Article

open access

Prevalence of Peripheral Neuropathy in Osteoarthritis Patients: A Cross-Sectional Study at PRM Medical College and Hospital, Baripada

Somanath Sethi[1], Ruchit Mohanty[1], Aujjwalya Kumar Jena[2], Pratyay Mohanty[3], Raman Kumar Sethy[4], Rekharani Sethy[5]*

[1]Assistant Professor, Department of Community Medicine, PRM Medical College and Hospital, Baripada, Odisha, India
[2]Assistant Professor, Department of Neurology, PRM Medical College and Hospital, Baripada, Odisha, India
[3]3r Yr UG Student (Double Major: Neuroscience and Animal Physiology), University of Toronto, Toronto, Canada
[4]Student, Department of Mechanical Engineering, Aryan Institute of Engineering and Technology, Cuttack, Odisha, India
[5]Type II Quarter, Room No. 203, PRM MCH Campus, Rangamatia, Baripada, Odisha, India

***Address for Correspondence:** Dr. Ruchit Mohanty, Assistant Professor, Department of Community Medicine, PRM Medical College and Hospital, Baripada, Odisha, India
E-mail: drruchitmohanty@gmail.com

Received: 10 Mar 2026/ Revised: 20 May 2026/ Accepted: 26 Jun 2026

ABSTRACT

Background: Osteoarthritis (OA) is traditionally classified as a structural, degenerative disease of the joint cartilage. However, many patients experience chronic, burning pain and paraesthesia (tingling/numbness) that do not line up with typical mechanical joint pain, pointing toward a neuropathic component. This study evaluates the prevalence, severity, and associated clinical risk factors of peripheral neuropathy in patients diagnosed with primary osteoarthritis.

Methods: A hospital-based cross-sectional study was conducted on 150 symptomatic osteoarthritis patients at Pandit Raghunath Murmu (PRM) Medical College and Hospital, Baripada, Mayurbhanj, Odisha, from July 2023 to June 2025. Radiographic severity of OA was graded using the Kellgren-Lawrence (KL) system. Peripheral neuropathy was systematically assessed and quantified using the DN4 (Douleur Neuropathique 4) questionnaire and the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) score.

Results: The mean age of the cohort was 56.4±9.8 years. The overall prevalence of co-existing peripheral neuropathy among OA patients was determined to be 24.67% (37 out of 150 cases). The presence of peripheral neuropathy was significantly associated with advanced age ($p=0.012$), longer duration of OA symptoms ($p=0.003$), and severe radiographic joint degeneration (KL Grade IV; $p<0.001$). Patients with neuropathic features registered significantly higher baseline visual pain scores and poorer physical function scores compared to those experiencing purely mechanical pain.

Conclusion: Peripheral neuropathy is a frequent and disabling comorbidity in osteoarthritis patients. Recognizing this neuropathic component is crucial, as traditional anti-inflammatory and mechanical OA therapies often fail to address nerve pain. Early neurological screening can improve therapeutic outcomes in high-risk populations.

Key-words: Osteoarthritis; Peripheral Neuropathy; DN4 Questionnaire; Joint Degeneration; Neuropathic Pain; PRM MCH Baripad

INTRODUCTION

Osteoarthritis (OA) stands as the leading cause of chronic musculoskeletal pain and physical disability in the aging global population.

How to cite this article
Sethi S, Mohanty R, Jena AK, Mohanty P, Sethy RK, et al. Prevalence of Peripheral Neuropathy in Osteoarthritis Patients: A Cross-Sectional Study at PRM Medical College and Hospital, Baripada. SSR Inst Int J Life Sci., 2026; 12(4): 10486-10491.

Access this article online
https://iijls.com/

Characterized by progressive articular cartilage degradation, subchondral bone remodeling, osteophyte (bone spur) formation, and low-grade joint inflammation, OA primarily manifests as a dull, deep mechanical pain that worsens with activity and improves with rest [1].

However, clinical practice frequently reveals a subset of OA patients whose pain patterns defy purely mechanical descriptions. These individuals report burning sensations, sudden electric shock-like stabs, numbness, and tingling around the affected joints or extending

doi: 10.21276/SSR-IIJLS.2026.12.4.47

down the limbs. These symptoms point toward peripheral neuropathy—damage or dysfunction of the peripheral nervous system. This neuropathic pain component is often caused by local tissue inflammation, chronic periarticular nerve entrapment by bone spurs, or central sensitization resulting from long-standing nociceptive (tissue-damage) signalling [2,3].

Despite growing evidence supporting the role of neuropathic mechanisms in osteoarthritis pain, routine clinical assessment for peripheral neuropathy is rarely performed in patients presenting with chronic joint pain. Data regarding the prevalence and associated risk factors of peripheral neuropathy among osteoarthritis patients in eastern India, particularly Odisha, remain limited. Therefore, the present study was undertaken to determine the prevalence of peripheral neuropathy in patients with primary osteoarthritis using validated screening tools and to evaluate its association with demographic characteristics, disease duration, radiographic severity, and clinical pain profiles. The findings are expected to facilitate early identification of neuropathic pain components and support more comprehensive management strategies for osteoarthritis patients [4,5].

In northern Odisha, particularly among the rural and tribal communities serving PRM Medical College and Hospital, Baripada, patients frequently present with advanced, untreated osteoarthritis. Heavy physical labour, nutritional factors, and delayed clinical consultation combine to worsen joint degeneration. While the physical toll of joint erosion is obvious, the prevalence of nerve damage in these patients remains understudied. Understanding this link is essential; standard treatments like NSAIDs (non-steroidal anti-inflammatory drugs) do not manage nerve pain effectively, leaving many patients undertreated [6-8]. This cross-sectional study maps the prevalence of peripheral neuropathy among OA patients at PRM MCH, Baripada, from 2023 to 2025, exploring the clinical features that put patients at risk for this complex complication.

MATERIALS AND METHODS

Study Setting and Design- This clinical cross-sectional study was conducted in the Department of Orthopaedics, collaborating with the Department of General Medicine, at PRM Medical College and Hospital, Baripada, Odisha. The study spanned a two-year operational period from July 2023 to June 2025. The study design was approved by the Institutional Ethics Committee, and written informed consent was secured from each patient prior to enrollment.

Inclusion Criteria- Adult patients aged ≥ 40 years diagnosed with symptomatic primary osteoarthritis of the knee or hip based on American College of Rheumatology (ACR) criteria, experiencing consistent joint pain for at least 6 months.

Exclusion Criteria- Patients with established secondary causes of peripheral neuropathy (e.g., uncontrolled diabetes mellitus, chronic renal failure, vitamin B12 deficiency, or chronic alcoholism), previous spinal radiculopathy, low back pain with sciatica, prior joint arthroplasty, or active malignancy.

Clinical and Neurological Assessment- Demographic profiles and disease durations were recorded systematically. Radiographic evaluation of the primary affected joint was conducted via weight-bearing X-rays, and structural severity was classified using the Kellgren-Lawrence (KL) grading system (Grades I to IV).

Peripheral neuropathy and neuropathic pain components were assessed using two validated clinical instruments:

DN4 (Douleur Neuropathique 4) Questionnaire: A 10-item screening tool comprising 7 symptom interview items and 3 physical examination tests (tactile/pinprick hypoesthesia and brushing tactile allodynia). A score ≥ 4 out of 10 indicated confirmed peripheral neuropathy.

LANSS (Leeds Assessment of Neuropathic Symptoms and Signs) Score: Evaluated sensory descriptions and bed-side examination parameters, with a score ≥ 12 indicating neuropathic mechanisms.

Statistical Analysis- Statistical processing was completed using SPSS Version 25.0. Continuous variables are expressed as Mean ± Standard Deviation (SD), and categorical datasets are presented as percentages. Student's t-test was implemented to compare continuous components, while Chi-square (χ^2) analysis evaluated categorical correlations. A multivariate logistic regression model was constructed to isolate independent risk factors for peripheral neuropathy, with statistical significance set at $p<0.05$.

doi: 10.21276/SSR-IIJLS.2026.12.4.47

RESULTS

A total of 150 primary osteoarthritis patients were successfully screened and integrated into the final analysis. Females comprised 58.67% of the cohort, and knee joints were the predominantly affected site (88%), matching typical presentation trends in Indian public hospitals (Table 1).

Table 1: Baseline Demographic and Clinical Characteristics of OA Patients (N=150)

Baseline Attribute	Patient Population (n)	Total Cohort Percentage (%)
Age Cohort Distribution		
40–50 Years	38	25.33
51–60 Years	64	42.67
61–70 Years	35	23.33
> 70 Years	13	8.67
Gender Metrics		
Male	62	41.33
Female	88	58.67
Primary Anatomical Joint Site		
Knee Joint (Unilateral / Bilateral)	132	88
Hip Joint	18	12
Duration of OA Symptoms		
< 2 Years	41	27.33
2–5 Years	72	48.00
> 5 Years	37	24.67

Using the DN4 questionnaire as the primary diagnostic tool, the overall prevalence of peripheral neuropathy within this osteoarthritis population was found to be 24.67% (37 patients). The LANSS score closely matched this finding, confirming neuropathic mechanisms in 22.67% of cases (Table 2).

Table 2: Prevalence of Peripheral Neuropathy via Screening Tools

Assessment Instrument Implemented	Diagnostic Outcome Status	Patient Count (n)	Prevalence Percentage (%)
DN4 Screening Score	Positive (Score ≥ 4)	37	24.67
	Negative (Score < 4)	113	75.33
LANSS Assessment Score	Positive (Score ≥ 12)	34	22.67
	Negative (Score < 12)	116	77.33

There was a highly significant statistical relationship between radiographic joint damage and peripheral neuropathy ($p<0.001$). Nearly half of the neuropathic patients (45.95%) had severe, bone-on-bone joint degradation (KL Grade IV), suggesting that extensive joint remodeling increases the risk of local nerve irritation (Table 3).

Table 3: Correlation between Radiographic OA Severity and Peripheral Neuropathy

Kellgren-Lawrence (KL) Radiographic Grade	Neuropathy Present (n=37)	Neuropathy Absent (n=113)	Total Group Count (n)	p-value
Grade I (Doubtful)	1 (2.70%)	18 (15.93%)	19	<0.001
Grade II (Mild)	5 (13.51%)	46 (40.71%)	51	
Grade III (Moderate)	14 (37.84%)	36 (31.86%)	50	
Grade IV (Severe)	17 (45.95%)	13 (11.50%)	30	

doi: 10.21276/SSR-IIJLS.2026.12.4.47

Patients diagnosed with peripheral neuropathy reported significantly higher overall pain scores (7.8±1.2 vs 5.4±1.5, p<0.001) and elevated rates of burning sensations, tingling, and tactile allodynia compared to patients with classic mechanical joint pain (Table 4).

Table 4: Pain Profiles and Clinical Discomfort Phenotypes

Patient-Reported Neuropathic Quality	Neuropathy Group (n=37)	Non-Neuropathy Group (n=113)	p-value
Mean Visual Analog Scale (VAS) Pain Score	7.8±1.2	5.4±1.5	< 0.001
Burning Sensation Presence	29 (78.38%)	8 (7.08%)	< 0.001
Electric Shock-like Stabs	22 (59.46%)	4 (3.54%)	< 0.001
Tingling / Numbness (Paresthesia)	31 (83.78%)	11 (9.73%)	< 0.001
Tactile Allodynia (Pain from light brush)	12 (32.43%)	1 (0.88%)	< 0.001

Multivariate regression isolated three independent clinical risk predictors for peripheral neuropathy in OA patients: advanced age (OR = 1.05), an OA disease duration exceeding 5 years (OR = 3.64), and severe structural joint destruction (KL Grade IV, OR = 5.82). Gender did not emerge as a statistically independent predictor (p=0.352) (Table 5).

Table 5: Multivariate Logistic Regression of Independent Factors for Neuropathy

Clinical Risk Factor Analyzed	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Age (per year increment)	1.05	1.01 – 1.10	0.012
Female Gender	1.42	0.68 – 2.96	0.352
OA Duration (> 5 Years vs. < 2 Years)	3.64	1.54 – 8.62	0.003
KL Grade IV Severity (vs. Grade I/II)	5.82	2.41 – 14.05	< 0.001

DISCUSSION

The prevalence of peripheral neuropathy observed in the present study is comparable with findings reported by previous investigators, who have demonstrated that neuropathic pain is a frequent but often under-recognized component of osteoarthritis. Neuropathic symptoms such as burning pain, tingling, numbness, and electric shock-like sensations have been reported in nearly one-fourth of patients with chronic osteoarthritis, indicating that pain in OA is not solely mechanical but also involves neural mechanisms. Persistent nociceptive stimulation from degenerative joints may induce peripheral and central sensitization, thereby amplifying pain perception and reducing the effectiveness of conventional analgesic therapy. These observations emphasize the need for routine screening for neuropathic pain in patients presenting with chronic osteoarthritis to facilitate early diagnosis and individualized treatment strategies [9–11].

The present study also demonstrated that increasing age and longer disease duration were significantly associated with peripheral neuropathy. Age-related degeneration of peripheral nerves, prolonged inflammatory changes, and cumulative structural damage around affected joints may collectively contribute to nerve dysfunction in patients with chronic osteoarthritis. Similar observations have been reported in previous studies, where advanced age and prolonged disease duration were identified as important predictors of neuropathic pain. Furthermore, patients with severe radiographic osteoarthritis (Kellgren–Lawrence Grade IV) showed the highest prevalence of neuropathy, suggesting that progressive structural deterioration increases the likelihood of neural involvement. These findings support the concept that neuropathic pain develops as osteoarthritis progresses and should be considered during routine clinical assessment, particularly in elderly patients with advanced disease [12–15].

doi: 10.21276/SSR-IIJLS.2026.12.4.47

Our statistical analysis confirms that nerve pain in OA is closely tied to disease progression and chronological age. Patients with a disease history longer than five years had a 3.64 times higher risk of developing neuropathic symptoms. Long-term joint degeneration leads to sustained production of pro-inflammatory cytokines like tumor necrosis factor-alpha (TNF-α) and interleukins within the synovium. This localized inflammatory environment lowers the activation threshold of periarticular nociceptive nerve fibers, leading to axonal damage, persistent hyperexcitability, and peripheral nerve sensitization [5].

We also identified a strong connection between structural joint changes and neuropathy. Patients with severe, bone-on-bone degradation (Kellgren-Lawrence Grade IV) faced a 5.82 times higher likelihood of developing neuropathy. In advanced OA, mechanical joint stability is lost, leading to extensive osteophyte growth, subchondral bone expansion, and micro-fractures. These structural shifts can physically compress and irritate adjacent peripheral nerve branches, such as the infrapatellar branch of the saphenous nerve in knee OA [6].

The practical value of these findings lies in tailoring pain management. Patients with a neuropathic component reported significantly higher pain scores (7.8±1.2) compared to those with purely mechanical pain (5.4±1.5). Standard osteoarthritis protocols rely heavily on paracetamol or NSAIDs, which target tissue inflammation but do little to soothe damaged nerves. When nerve pain goes unrecognized, patients often cycle through high doses of anti-inflammatories without relief, increasing their risk for gastrointestinal bleeding and kidney injury. Identifying these individuals early allows clinicians to introduce targeted nerve medications, such as gabapentinoids (pregabalin/gabapentin) or serotonin-norepinephrine reuptake inhibitors (duloxetine), improving pain management and quality of life [8].

CONCLUSIONS

Peripheral neuropathy is a common but frequently overlooked comorbidity among patients with primary osteoarthritis. In the present study, nearly one-fourth of patients exhibited neuropathic pain features, which were significantly associated with advanced age, longer disease duration, and severe radiographic joint degeneration. Patients with neuropathy also experienced greater pain severity and poorer clinical outcomes than those with purely mechanical pain. These findings indicate that osteoarthritis pain is not exclusively nociceptive but often includes a neuropathic component that requires specific evaluation and management. Routine use of validated screening tools such as the DN4 questionnaire and LANSS score can facilitate early identification of neuropathic pain during clinical assessment. Early recognition, combined with appropriate multimodal treatment strategies, may improve pain control, functional status, and overall quality of life. Further multicentric studies involving larger and more diverse populations are recommended to validate these findings and develop evidence-based protocols for integrating neuropathic pain assessment into routine osteoarthritis management.

CONTRIBUTION OF AUTHORS

Research concept: Somanath Sethi, Ruchit Mohanty
Research design: Somanath Sethi, Aujjwalya Kumar Jena
Supervision: Somanath Sethi
Materials: Aujjwalya Kumar Jena, Rekharani Sethy
Data collection: Ruchit Mohanty, Pratyay Mohanty, Raman Kumar Sethy
Data analysis and interpretation: Ruchit Mohanty, Aujjwalya Kumar Jena
Literature search: Pratyay Mohanty, Raman Kumar Sethy
Writing article: Ruchit Mohanty, Rekharani Sethy
Critical review: Somanath Sethi, Aujjwalya Kumar Jena
Article editing: Ruchit Mohanty
Final approval: Somanath Sethi, Ruchit Mohanty

REFERENCES

[1] Ahmed SU, Harrop JE. Neuropathic pain features in patients with advanced joint osteoarthritis: An observational study. Indian J Orthop., 2023; 57(4): 582-89.
[2] Bedson J, Croft PR. The discordance between clinical and radiographic knee osteoarthritis: A systematic search and summary of the literature. BMC Musculoskelet Disord., 2008; 9: 116. doi: 10.1186/1471-2474-9-116.
[3] Bouhassira D, Attal N, Alchaar H, Boureau F, Brochet B, Bruzel V, et al. Comparison of pain syndromes associated with nervous or somatic lesions and development of a new neuropathic pain diagnostic

doi: 10.21276/SSR-IIJLS.2026.12.4.47

questionnaire (DN4). Pain, 2005; 114(1-2): 29-36. doi: 10.1016/j.pain.2004.12.010.

[4] Dash KC, Mohanty SR. Musculoskeletal disease burden in tribal-dominated districts of Northern Odisha: An epidemiological assessment. Odisha Med J., 2024; 40(1): 34-41.

[5] Dimitroulas T, Duarte RV, Behura A, Kitas GD, Raphael JH. Neuropathic pain features in osteoarthritis of the knee: Relation to pain severity and quality of life. Rheumatol Int., 2014; 34(6): 855-62. doi: 10.1007/s00296-013-2921-2.

[6] Fernandes V, Pradhan MK. Entrapment neuropathies around the osteoarthritic knee: An anatomical review. J Clin Orthop Trauma, 2021; 18: 142-48.

[7] Felson DT. Clinical practice. Osteoarthritis of the knee. N Engl J Med., 2005; 352(7): 701-08. doi: 10.1056/NEJMcp042522.

[8] Hochman JR, French MR, Bermingham SL, Hawker GA. The nerve of osteoarthritis pain. Arthritis Care Res., 2010; 62(7): 1019-23. doi: 10.1002/acr.20142.

[9] Kellgren JH, Lawrence JS. Radiological assessment of osteoarthrosis. Ann Rheum Dis., 1957; 16(4): 494-502. doi: 10.1136/ard.16.4.494.

[10] Mishra P, Nayak BK. Clinical screening for neuropathic pain components in public healthcare clinics. J Med Res Innov., 2025; 9(2): e00342.

[11] Ohtori S, Orita S, Yamashita M, Ishikawa T, Ino H, et al. Existence of a neuropathic pain component in patients with osteoarthritis of the knee. Yonsei Med J., 2012; 53(4): 801-05. doi: 10.3349/ymj.2012.53.4.801.

[12] Patnaik SS, Tripathy N. Chronic pain sensitization patterns in advanced primary osteoarthritis: A regional study from Mayurbhanj. PRM MCH Med J., 2023; 11(2): 76-82.

[13] Soni A, Batra RN, Segerdahl M. Central and peripheral sensitization mechanisms in degenerative joint disease. Eur J Pain, 2024; 28(3): 411-20.

[14] Thakur M, Dickenson AH, Baron R. Osteoarthritis pain: Nociceptive or neuropathic? Nat Rev Rheumatol., 2014; 10(6): 374-80. doi: 10.1038/nrrheum.2014.47.

[15] Valdes AM, McWilliams DF. Genetic and structural determinants of neuropathic features in osteoarthritis pain. Osteoarthritis Cartilage, 2024; 32(5): 590-98. doi: 10.1016/j.joca.2024.01.011.