International Journal of Research in Orthopaedics
Khanna M et al. Int J Res Orthop. 2025 Nov;11(6):1422-1429
http://www.ijoro.org

Original Research Article

DOI: https://dx.doi.org/10.18203/issn.2455-4510.IntJResOrthop20253417

Clinical practice trends and therapeutic preferences in osteoarthritis management: a cross-sectional survey of orthopaedic surgeons in India

Manish Khanna[1]*, Amitava Narayan Mukherjee[2], Partha Sarathi Sarkar[3], Vishnu Senthil[4], Rajesh Gupta[5], Shantanu Lakhar[6], Atul Sharma[7], Tanya Bhagat[7]

[1]Department of Orthopaedics, Dr. KNS Memorial Institute of Medical Sciences, Lucknow, Uttar Pradesh, India
[2]Indian Orthopaedic Rheumatology Association
[3]Department of Orthopaedics, North Bengal Medical College & Hospital, Kolkata, West Bengal, India
[4]Department of Orthopaedics, Government Royapettah Hospital, Chennai, Tamil Nadu, India
[5]Department of Orthopaedics, ASCOMS and Hospital, Jammu, Jammu and Kashmir, India
[6]Department of Orthopaedics, Archana Trauma and Orthopedics Hospital, Dibrugarh, Assam, India
[7]Medical and Scientific Affairs, GSK Consumer Healthcare/Haleon, Gurugram, Haryana, India

Received: 31 July 2025
Revised: 18 September 2025
Accepted: 14 October 2025

***Correspondence:**
Dr. Manish Khanna,
E-mail: dr.manishkhanna@outlook.com

ABSTRACT

Background: Osteoarthritis (OA) is a leading cause of disability worldwide and presents a growing challenge, particularly in India's aging population. Despite its burden, there is a limited data exist on how OA is managed in real-world clinical settings across India. This study assessed the prescribing patterns and therapeutic preferences of orthopaedic surgeons in India, focusing on pharmacological interventions, intra-articular therapies, and the utilization of adjunctive treatments such as collagen and nutritional supplements.
Methods: A total of 250 orthopaedic surgeons across India participated in this cross-sectional survey carried out by the Indian Orthopaedic Rheumatology Association (IORA). The 32-item questionnaire created by orthopaedic surgeons explored clinical observations, treatment preferences, comorbidity challenges, and attitudes toward nutraceutical use in OA management.
Results: Most clinicians reported a high OA burden in their practice, with symptom onset frequently observed as early as 30–45 years. Obesity and poor nutritional status were identified as common complicating factors. Lifestyle modification was the preferred initial approach, followed by acetaminophen as the first-line pharmacologic agent, especially in elderly patients or those with comorbidities. Topical NSAIDs were favoured for their efficacy and safety profile. A growing role for undenatured collagen type II (UC-II, Lonza) was evident, with 55.2% of respondents prescribing it routinely, particularly in mild-to-moderate OA. Over 75% supported its early initiation, and nearly half considered it for preventive use in high-risk individuals.
Conclusions: Indian orthopaedic surgeons are increasingly adopting a holistic, multimodal approach for osteoarthritis management, balancing early intervention with safety. The growing use of UC-II and nutritional supplements highlights a preventive shift in clinical practice.

Keywords: Osteoarthritis, Nonsteroidal anti-inflammatory drugs, Intra-articular injections, Nutraceuticals, Undenatured type II collagen

INTRODUCTION

Osteoarthritis (OA) is the most common form of joint disorder globally. It is a progressive degenerative condition that results in the gradual destruction of the articular cartilage along with other surrounding joint structures.[1] Characteristic symptoms of OA include joint pain, swelling, and stiffness, which progressively impair mobility and overall function.[2] Despite being the most common musculoskeletal condition globally, contributing significantly to health, economic, and social burdens, the exact aetiology of OA remains unclear.[1]

In 2021, an estimated 607 million people (95% uncertainty interval [UI]: 538–671 million) were affected by OA, representing 7.7% of the global population. By 2036, the age-standardized prevalence of OA is projected to increase among males from 5,763 to 5,922 per 100,000, while it is expected to slightly decline among females from 8,034 to 7,925 per 100,000.[3] In India, the OA burden has escalated sharply over the past three decades, with symptomatic cases rising from 23.46 million in 1990 to 62.35 million in 2019, representing a 2.66-fold increase. In the same year, OA ranked as the twentieth most common cause of years lived with disability (YLDs), contributing to 1.48% of total YLDs, rising from 1.25% in 1990. Knee OA continues to be the predominant form of the disease, and the prevalence, incidence, and disability-adjusted life years (DALYs) associated with OA and knee OA have consistently been higher in females compared to males.[4]

OA management primarily remains palliative, focusing mainly on symptomatic relief, especially pain control as a key treatment target. The primary goals of therapy are to relieve symptoms, maintain joint function, slow disease progression, and postpone or prevent surgical interventions such as joint replacement. Initial management typically involves non-pharmacological strategies like weight management, physical activity, and lifestyle modifications, along with the use of analgesics and topical agents.[5] As the disease progresses, treatment typically advances to patient education, physiotherapy, pharmacologic agents such as non-steroidal anti-inflammatory drugs (NSAIDs), nutraceuticals, vitamins and minerals to improve status and symptomatic slow-acting drugs for OA, and eventually surgical interventions.[6]

Among pharmacological options, NSAIDs remain the most frequently prescribed medications for OA, offering symptomatic relief, without impact on disease progression.[6] However, long-term NSAID use is associated with adverse effects, including gastrointestinal ulcers and cardiovascular complications. Topical NSAIDs are designed for direct application at the site of pain, providing localized relief, ease of application, and minimizing systemic exposure thereby reducing gastrointestinal complications and systemic toxicity.[6,7]

Despite the high disease burden and the widespread use of various treatment, there remains a lack of studies within India that comprehensively explore current management practices for OA.[1] To address this gap, we conducted a cross-sectional survey to gain insights into the prescribing practices of Indian orthopaedic surgeons in the pharmacological management of OA.

METHODS

Study design and participants

This was a cross-sectional, web-based survey conducted among orthopaedic surgeons across India. The aim was to understand current trends in the pharmacological management of OA in real-world clinical practice. Invitations were sent via email to practicing orthopaedic surgeons working in both urban and semi-urban settings, ensuring representation from different regions and practice types.

Surgeons were eligible to participate in the survey if they met the following criteria: licensed orthopaedic surgeons actively practicing in India; surgical practice in a hospital, clinic, or academic setting; able to read and respond to the survey in English, with access to the internet; provided informed consent to participate in the study.

Surgeons were excluded from participation if they met any of the following conditions: non-practicing status (retired, not currently engaged in clinical practice, or practicing outside India); incomplete responses (submitted partially completed surveys or failed to respond to questions relevant to OA pharmacological management).

Questionnaire development

The survey consisted of 32 multiple-choice questions. The questionnaire was developed in consultation with a panel of experienced orthopaedic surgeons and reviewed for clinical relevance, clarity, and completeness. Based on their feedback, necessary revisions were incorporated prior to distribution. This process helps ensure the validity and applicability of the questions to routine clinical practice. Some questions allowed multiple responses to capture the range of real-world clinical choices. The questions covered five key themes including Demographics and clinical background, Challenges in OA management, Oral pharmacological treatment preferences, Use of intra-articular (IA) therapies and Supplementation practices (including vitamins, minerals, and collagen-based agents)

Data collection and sample size

According to recent estimates, there are approximately 10,847 practicing orthopaedic surgeons in India. To determine an appropriate sample size for this survey, a confidence level of 90% and a margin of error of 5% were applied, resulting in a calculated requirement of 264 responses to ensure reliable representation of the target

population. The survey ultimately received 250 complete responses from orthopaedic surgeons across the country, providing a robust dataset that closely approaches the targeted sample size and is sufficient to reflect prevailing trends in OA management among orthopaedic practitioners in India.

Data analysis

Survey responses were collected anonymously and exported to Microsoft Excel for analysis. Descriptive statistics were applied to summarize the data. Categorical variables are reported as frequencies and percentages. For questions allowing multiple responses, the percentages represent the proportion of respondents selecting each option; therefore, totals may exceed 100%, as participants could choose more than one answer.

RESULTS

A total of 250 orthopaedic surgeons from across India participated in this survey, sharing valuable insights into osteoarthritis management. Regarding the prevalence of OA in routine clinical practice, 39.6% of clinicians estimated that OA represents 31–50% of their patient population, while 30% mentioned prevalence of 20–30%, and 26% noted that OA cases accounted for more than 50% of their practice. With several orthopaedic clinics handling a considerable percentage of OA patients, these results draw attention to the huge burden of OA in India.

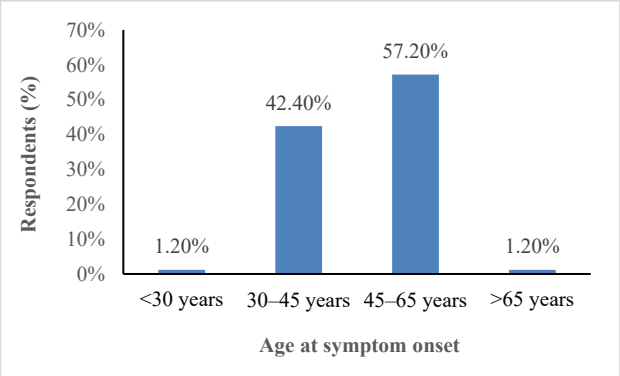

Figure 1: Age of onset for osteoarthritis symptoms as observed in clinical practice.

According to most clinicians in the survey, the age of onset of OA symptoms was largely between 45 and 65 years, as stated by 57.2% of respondents, while a significant 42.4% reported symptom onset between 30 and 45 years (Figure 1). This trend towards earlier disease onset raises concerns regarding shifting risk profiles and underscores the need for earlier clinical intervention. Correspondingly, when clinicians were asked to determine the percentage of their OA patients affected by comorbidities such as osteoporosis or nutritional deficiencies, 34.4% reported these concerns in 21–40% of patients, while another 34% found these comorbidities in 41–60% of their OA patient. When viewed with the prior stated trend of younger onset, this finding implies a possible impact of nutritional deficiencies and metabolic bone health abnormalities in accelerating disease progression in younger individuals.

The knee was the most commonly affected joint in OA as reported by 95.6% of clinicians, followed by the lumbar spine (22.4%). Involvement of the hand and hip joints was relatively uncommon, at 2% each, confirming that knee OA remains the predominant clinical presentation in Indian practice. Obesity emerged as the leading comorbidity complicating OA management, reported by 60% of respondents. Other significant contributors included patient non-compliance to pharmacological treatment (33.2%), hypertension (18.8%), metabolic syndrome (10.8%), poor nutritional status, and adverse drug reactions. These findings highlight the multifactorial nature of OA management challenges, where patient adherence, metabolic health, and comorbidity all play crucial roles.

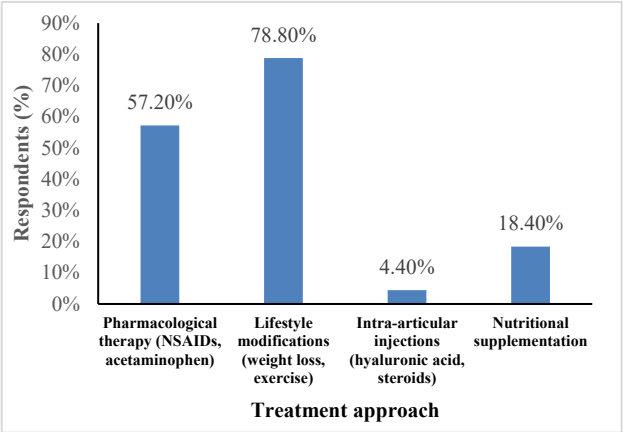

Figure 2: First-line treatment approaches for osteoarthritis management.

In terms of first-line treatment strategies, lifestyle modifications such as weight reduction and physical activity were favoured by 78.8% of respondents, underscoring the foundational role of non-pharmacological interventions. Pharmacotherapy, including NSAIDs and acetaminophen, was chosen by 57.2% of clinicians, while nutritional supplementation was considered by 18.4%. IA interventions were less commonly selected as initial therapy, with only 4.4% of respondents opting for such approaches (Figure 2), indicating a prevailing preference for conservative management in the early stages of disease.

The consistent identification of obesity (60%) as a major complicating factor, alongside the strong emphasis on lifestyle modifications, reflects a clear alignment between recognised risk factors and clinical practice priorities. However, the significant rates of patient non-compliance (33.2%) highlight challenges in translating these preventive strategies into effective, sustained behavioural changes.

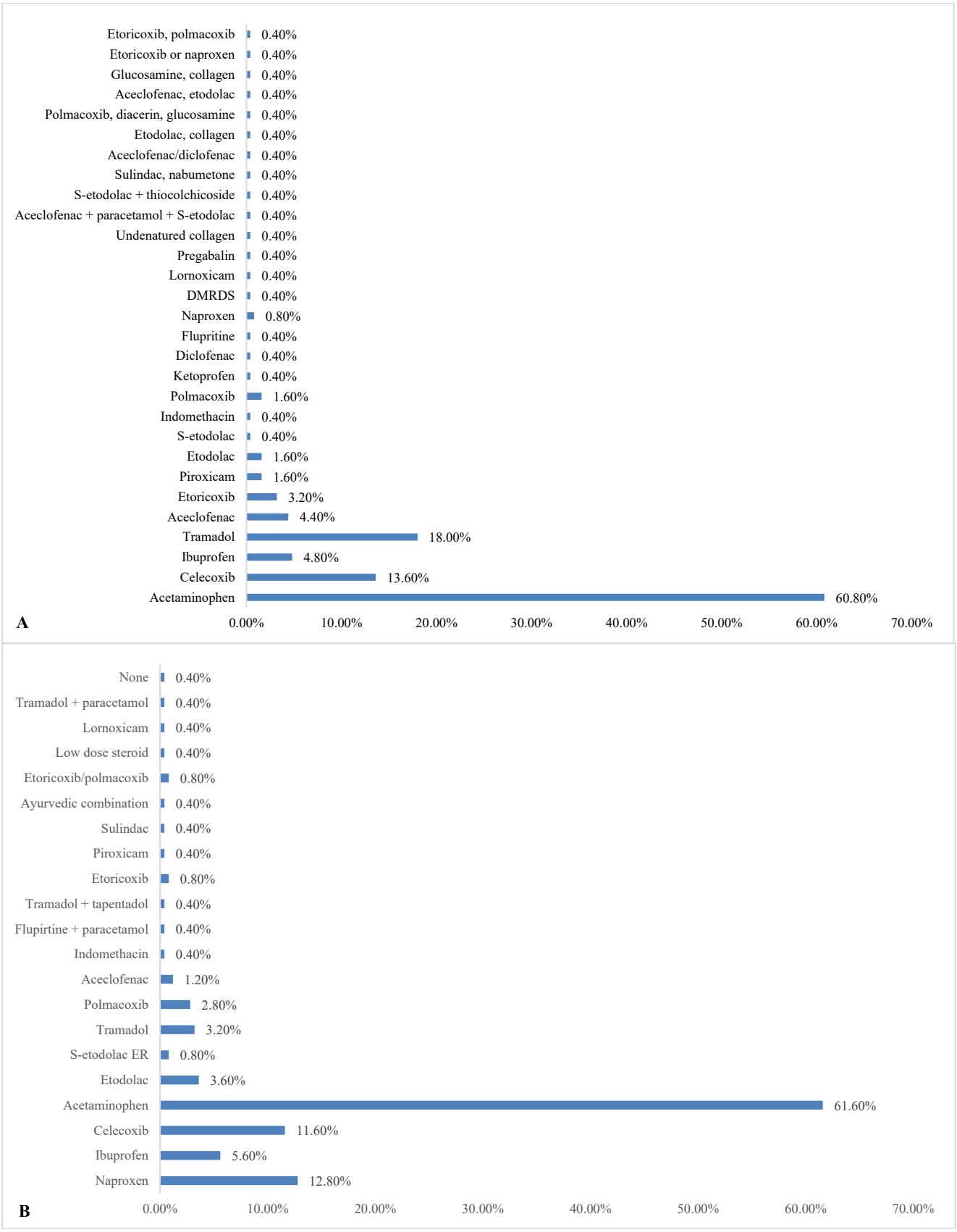

Figure 3: Pharmacological preferences for (A) elderly OA patients (B) OA patients with cardiovascular risk.
DMRDS: Disease-modifying antirheumatic drugs; ER: Extended-release.

With respect to pharmacological preferences in comorbid OA populations, clinicians demonstrated a consistently cautious approach favouring safer analgesic profiles across high-risk groups. In elderly patients aged ≥65 years, acetaminophen emerged as the most frequently selected first-line oral agent (58.4%) (Figure 3A), reflecting its well-established safety in this demographic. Alternatives such as tramadol (18%) and celecoxib (13.6%) were also considered, offering additional analgesic options, when necessary, whereas NSAIDs like ibuprofen (4.8%) and aceclofenac (3.6%) were prescribed more sparingly, underscoring a deliberate avoidance of gastrointestinal and cardiovascular risks associated with traditional NSAIDs in older adults. Notably, this preference for acetaminophen extended consistently to other high-risk cohorts, including patients with cardiovascular comorbidities (60%) (Figure 3B), and those with gastrointestinal vulnerabilities (37.2%), reinforcing its position as the default safer choice across multiple risk strata. In patients with renal impairment, tramadol was clearly favoured (57.2%), followed by acetaminophen (38.8%), aligning with efforts to minimise nephrotoxicity while maintaining pain control. Likewise, in patients with gastrointestinal risk, clinicians predominantly opted for acetaminophen and tramadol, reflecting a cautious yet practical strategy to minimise gastrointestinal complications.

When selecting pharmacotherapy for OA, clinicians predominantly prioritised efficacy in pain relief (66.4%), followed by considerations of safety (45.6%) and comorbidities (43.6%). Cost (14.4%) and patient preference (5.2%) were lesser concerns. For opioid selection specifically, pain severity (48.4%) and patient comorbidities (43.6%) were critical factors, alongside renal function (29.6%) and history of substance abuse (19.6%). These responses reflect a balanced approach that carefully weighs efficacy against safety risks. In cases of inadequate response to NSAIDs or acetaminophen, 50% of respondents preferred adding adjuvant therapy, while 26.4% turned to non-pharmacological approaches, and 21.2% escalated to opioids. Referral to a specialist was rarely chosen (2%), indicating a preference for stepwise, in-practice escalation rather than early external referral.

Clinicians demonstrated a notable emphasis on early joint preservation, with 44.8% considering cartilage repair and regeneration important, and 36.8% regarding it as a top priority. Such perspectives support the growing role of interventions targeting structural preservation, particularly in early OA. Pain severity (52.4%) and response to prior treatment (45.6%) mostly drove decision-making for IA corticosteroid injections; patient health status (16.8%), cost (11.2%), and patient preference (13.2%) were given less consideration. Hyaluronic acid injections were preferred for their potential longer duration of relief (32.4%), especially when corticosteroids were unsuitable (31.2%) or when other treatments had failed (30.8%). The considerations for selecting IA injections of hyaluronic acid and corticosteroids are described in Figure 4. In comorbid patients, 24.4% of clinicians favoured hyaluronic acid, highlighting its perceived safety advantage in complex cases. Predominantly, concerns about corticosteroid injections focused on short efficacy duration (54.8%), infection risk (42.8%), and adverse effects (37.2%). Consistent with the therapeutic escalation approach, 81.2% of clinicians moved to surgical intervention after IA treatments failed; while 14% considered adding oral medications, and 13.6% opted to switch injection types. These results highlight a critical therapeutic gap where effective adjuncts, such as nutraceuticals, could play a role in delaying the need for surgery.

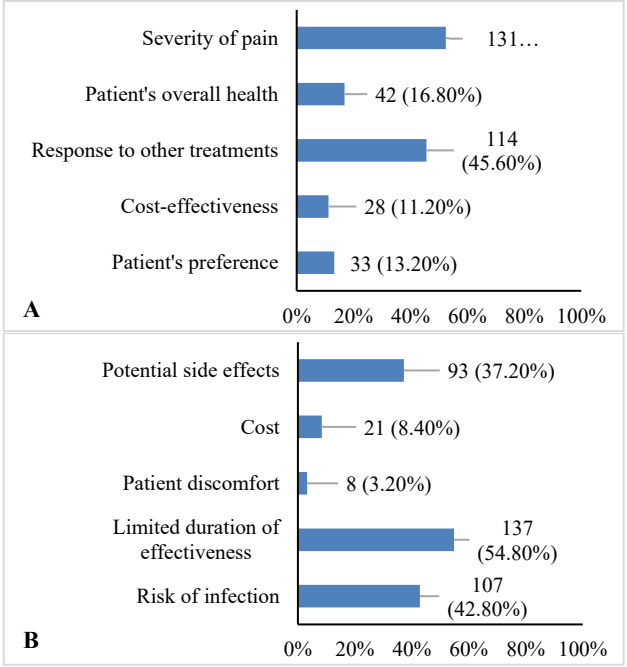

Figure 4: Considerations for selecting (A) IA injections of hyaluronic acid and (B) IA injections of corticosteroids.

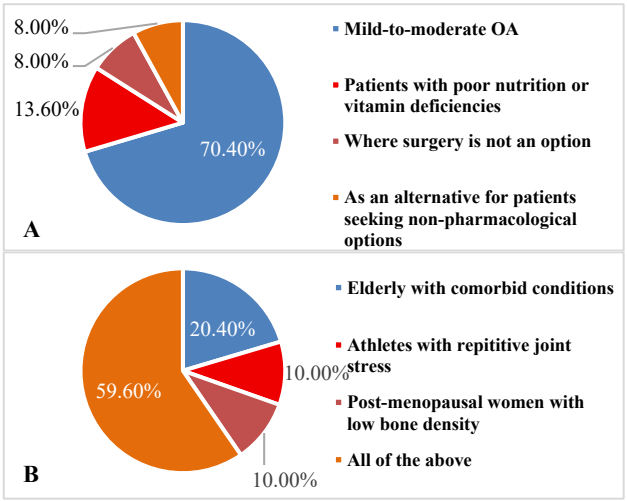

Figure 5: (A) Osteoarthritis patient profiles most suitable for undenatured collagen type II supplementation and (B) patient populations considered ideal candidates for undenatured collagen type II combination therapy.

Undenatured collagen type II (UC-II, Lonza) supplementation featured prominently in clinician practice, with 55.2% reporting frequent use, rising to 58.4% when combined with vitamins and minerals. Among patients with OA, clinicians most commonly recommended this combination for patients with mild-to-moderate OA (70.4%), those with nutritional deficiencies (13.6%), cases where surgery was not an option (8%), and as a non-pharmacological alternative (8%) (Figure 5A). Clinicians identified major patient groups who may benefit from UC-II and vitamin supplementation, including the elderly, athletes, and post-menopausal women (59.6%) (Figure 5B).

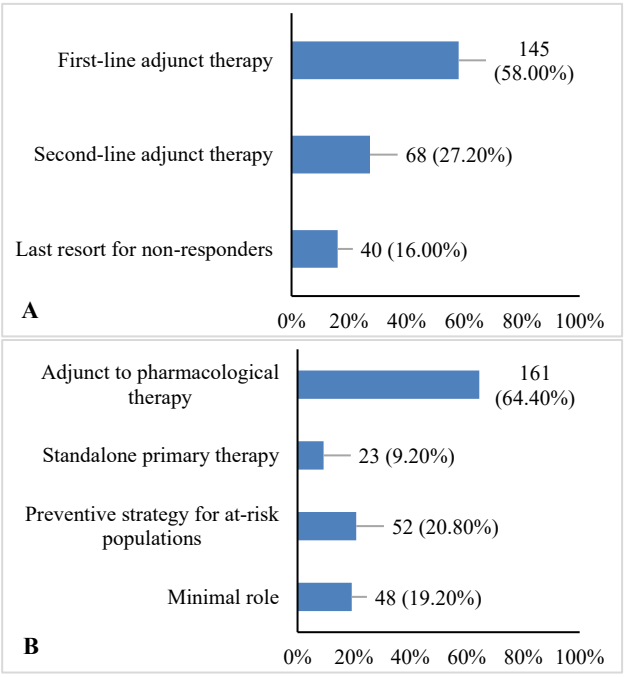

Figure 6: Undenatured collagen type II and supplements (A) clinical positioning as alternatives to NSAIDs and (B) perceived future role in OA management.

Regarding treatment duration, 60.8% clinician recommended discontinuing vitamins and minerals after three months while continuing UC-II, reflecting clinical judgement that initial supplementation corrects deficiencies, after which collagen can maintain cartilage integrity. In OA management, vitamin D stood out (60%) as the foremost recommendation, followed by calcium (18.8%) and vitamin K2 (8.8%). Interestingly, the importance of vitamin K2 in optimizing calcium utilization in osteoporotic patients was considered essential by 34% of respondents and moderately beneficial by 45.6%, highlighting its emerging role in musculoskeletal health. 44% of clinicians recognised moderate synergy between UC-II and pharmacological therapy, with 30.4% perceiving high synergy. Additionally, 58% recommended UC-II and supplements as first-line adjuncts when seeking alternatives to NSAID-based regimens (Figure 6A). These highlight a growing clinical confidence in integrative approach for OA management.

Especially, 75% advised starting UC-II early at the first indication of symptoms; 48% backed its use as a preventative strategy in high-risk people including those with a family history of OA or early signs of joint discomfort. Finally, 64.4% of clinicians viewed UC-II as an addition to pharmacotherapy rather than as a standalone treatment, reinforcing its role within a comprehensive, multimodal management approach aimed at maximize both structural joint support and symptom control (Figure 6B).

DISCUSSION

The main purpose of drug utilization research is to enhance the use of drugs in a rational manner and to increase the knowledge of the right use of drugs among the clinicians. In osteoarthritis, a disease that is defined by joint pain, swelling, and stiffness, management is still challenging and may involve pharmacological and non-pharmacological interventions. Due to the chronic nature of OA and the potential risks of long-term therapy, including adverse effects and increased healthcare costs, it is important to evaluate the prescribing patterns from time to time. These periodic assessments can assist in the improvement of treatment approaches, thus improving the efficacy of treatment and reducing the adverse effects.[5]

According to our study, osteoarthritis symptoms were most frequently reported to have started between the ages of 45 and 65 in Indian population. However, a significant percentage of clinicians (42.4%) noted that symptoms could begin as early as 30 to 45 years old, indicating a younger demographic burden trend developing due to changing lifestyle. This is consistent with the mean age reported by Gupta et al, (61.7 years) and other Indian research, such Bishnoi et al, which found that the same age group was primarily impacted.[6,8] In line with earlier research, the knee joint was the most commonly affected region, according to 95.6% of survey participants. [9,10] The predominance of knee OA may be partly attributable to traditional Indian practices involving frequent squatting and cross-legged sitting, which impose greater stress on the knee joint.[6]

Symptomatic alleviation is the major goal of pharmacological therapy in osteoarthritis; NSAIDs and analgesics continue to be the foundation of treatment. While joint replacement surgery offers definitive relief in advanced cases, no therapies currently exist to halt or reverse disease progression. Management usually combines drug choices with non-pharmacological strategies including diet, weight reduction, yoga, acupuncture, and physical rehabilitation, including transcutaneous electrical nerve stimulation (TENS) and thermotherapy, as similarly shown in our study, where clinicians strongly preferred lifestyle changes like weight loss and exercise as first-line treatments.[11] NSAIDs,

including acetaminophen, ibuprofen, diclofenac, and cyclo-oxygenase 2 (COX-2) inhibitors, alongside IA corticosteroids, are frequently employed for pain control. Topical agents like NSAIDs, lidocaine, and capsaicin help minimise systemic side effects through local action. IA corticosteroid injections remain widely used, with preparations such as methylprednisolone and triamcinolone being common choices. Valued for their contribution to synovial fluid viscosity and joint lubrication, hyaluronic acid injections still act as an adjuvant treatment to alleviate symptoms and maintain joint function.[11]

Our survey findings reflected a similarly cautious clinical approach, with patient non-compliance emerging as a major barrier to effective implementation of non-pharmacological strategies. Notably, despite the preference for acetaminophen in elderly and high-risk populations, many clinicians acknowledged the need to escalate therapy due to inadequate symptom control. Evidence from a network meta-analysis demonstrated that topical and oral NSAIDs provide comparable functional improvements and are more effective than paracetamol, with topical formulations significantly reducing gastrointestinal side effects.[12] Real-world data further suggest that topical NSAIDs are associated with a lower risk of mortality, cardiovascular disease, and gastrointestinal bleeding compared to both oral NSAIDs and paracetamol. Cochrane review findings have also shown that around 60% of patients achieve at least 50% pain relief with topical NSAIDs, comparable to oral NSAIDs and better than placebo. Current clinical guidelines strongly support these findings: the AAOS recommends topical NSAIDs for symptomatic knee OA, Osteoarthritis Research Society International (OARSI) suggests them as first-line therapy, and both American College of Rheumatology/ Arthritis Foundation and European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) guidelines prioritise topical over oral NSAIDs when needed for pain control.[12] OARSI and ESCEO provide conditional recommendations, especially in patients without comorbidities. Use is cautioned or discouraged in those with elevated cardiovascular, renal, or gastrointestinal risks. In such cases, low-dose, short-duration regimens or co-administration with proton pump inhibitors are advised. In frail patients, NSAIDs are generally avoided.[13] These global recommendations resonate with the prescribing patterns observed in our survey, reinforcing an opportunity to optimise OA management pathways while prioritising patient safety.

Vitamins and minerals play a crucial adjunctive role in the management of osteoarthritis, particularly given their influence on bone health, inflammation modulation, and connective tissue maintenance.[14] Vitamin D, strongly emphasised in our study as the foremost priority by 60% of clinicians, supports bone differentiation and exerts anti-inflammatory effects, while its synergy with vitamin K2 ensures optimal calcium deposition into bones, preventing pathological calcification of joint tissues. Notably, our respondents also recognised the role of vitamin K2, with 34% considering it essential and 45.6% rating it moderately beneficial in OA management. Other important micronutrients include calcium, recommended by 18.8% of clinicians, and vitamin C, which is critical for cartilage and collagen maintenance. B-complex vitamins further contribute by reducing inflammation and supporting antioxidant defences, while vitamin E, a potent antioxidant, offers protective effects against oxidative stress.[14] Reflecting clinical practice, most physicians in our study advised a treatment duration of three months for vitamin and mineral supplementation, after which only UC II was continued, indicating an approach focused on initial correction of deficiencies followed by long-term joint support.

A major structural protein in articular cartilage, type II collagen is essential for maintaining cartilage integrity, encouraging chondrocyte growth, and supporting bone health. Comprising more than 80% of the collagen matrix in cartilage, its particular three alpha1 peptide chain structure enhances joint function and toughness. The centres in India. A total of 291 patients were enrolled and assessed on days 30, 60, and 90 using the Western Ontario and McMaster Universities Arthritis Index (WOMAC) and Visual Analogue Scale (VAS). Of these, 226 patients completed the 90-day follow-up. The results demonstrated a significant reduction in both WOMAC and VAS scores over time, indicating symptomatic improvement. No adverse events were reported throughout the study period. The findings support the safety and efficacy of UC-II in Indian patients with OA and suggest its potential role in early disease management.[18] Consistently, results from our survey confirm this even more; 55.2% of clinicians say they use UC-II regularly and 58.4% prefer its combination with minerals and vitamins, especially in mild to moderate OA situations. Reflecting increasing clinical confidence in its role as both a therapeutic and preventive approach in osteoarthritis therapy, 75% of clinicians advised early UC-II initiation at the onset of symptoms. Moreover, almost half (48%) of the clinicians acknowledged its possible preventive function in high-risk people, including those with family history or early joint discomfort. A cross-sectional digital survey by Saini et al, involving 207 orthopaedic surgeons reported that 66% of respondents believed UC-II to be more effective, and 68% considered it safer compared to disease-modifying osteoarthritis drugs (DMOADs).[19] Our findings reflect a growing shift toward comprehensive, proactive, and patient-focused osteoarthritis care that integrates pharmacological, IA, and lifestyle strategies.

CONCLUSION

This survey highlights a balanced, patient-centred approach to osteoarthritis management among Indian orthopaedic surgeons. Lifestyle changes remain the preferred first-line strategy, with pharmacologic care tailored to comorbidities. Acetaminophen and topical

NSAIDs are favoured for safety, while supplements like vitamin D and UC-II are increasingly integrated for symptom relief and prevention of joint cartilage deterioration. These trends reflect a shift toward early, multimodal, and preventive care.

Funding: No funding sources
Conflict of interest: Dr. Manish Khanna, Dr. Amitava Narayana Mukherjee, Dr. Partha Sarathi Sarkar, Dr. Vishnu Senthil, Dr. Rajesh Gupta, and Dr. Shantanu Lakhar declare that they have no conflict of interest. Dr. Atul Sharma and Tanya Bhagat are on the payrolls of Haleon/GlaxoSmithKline Asia Private Limited, India
Ethical approval: Not required

REFERENCES

1. Desai H, Shah R, Shah H, Thakkar K. Prevalence and medicinal practices for osteoarthritis in Western India. Natl J Physiol Pharmacy Pharmacol 2020;11:78-83.
2. Osteoarthritis. Who.int. Available at https://www.who.int/news-room/fact-sheets/detail/osteoarthritis. Accessed on 12 April 2025.
3. Xie X, Zhang K, Li Y, Li Y, Li X, Lin Y, et al. Global, regional, and national burden of osteoarthritis from 1990 to 2021 and projections to 2035: A cross-sectional study for the Global Burden of Disease Study 2021. PLoS One 2025;20(5):e0324296.
4. Singh A, Das S, Chopra A, Danda D, Paul BJ, March L, et al. Burden of osteoarthritis in India and its states, 1990-2019: Findings from the Global Burden of disease study 2019. Osteoarthritis Cartilage. 2022;30:1070-8.
5. Siddiqui RA, Shende TR, Salankar HV, Rode SB. Drug prescription pattern in osteoarthritis in a tertiary care teaching hospital. J Pharm Res Int. 2022;34(6):19-24.
6. Gupta R, Malhotra A, Malhotra P. Study of prescription pattern of drugs used in the treatment of osteoarthritis in a tertiary care teaching hospital: An observational study. Int J Res Med Sci. 2018;6:985-9.
7. Derry S, Conaghan P, Da Silva JAP, Wiffen PJ, Moore RA. Topical NSAIDs for chronic musculoskeletal pain in adults. Cochrane Database Syst Rev. 2016;4:CD007400.
8. Bishnoi M, Kumar A, Kulkarni SK. Prescription monitoring of management pattern of osteoarthritis with non-steroidal anti-inflammatory drugs at PUHC, Chandigarh in India. Indian J Pharm Sci. 2006;68:525-7.
9. Ullal DS, Narendranath S, Kamath KR, Pai SM, Kamath US, Savur AD. Prescribing pattern for osteoarthritis in a tertiary care hospital. J Clin Diagn Res. 2010;4:2421-6.
10. Jhanwar P. Drug utilization study of osteoarthritis in a tertiary care teaching hospital of Rajasthan. Int J Pharm Scie Rev Res. 2012;14:35-7.
11. Maqbool M, Fekadu G, Jiang X, Bekele F, Tolossa T, Turi E, et al. An up to date on clinical prospects and management of osteoarthritis. Ann Med Surg. 2021;72:103077.
12. Shtroblia V, Petakh P, Kamyshna I, Halabitska I, Kamyshnyi O. Recent advances in the management of knee osteoarthritis: A narrative review. Front Med (Lausanne). 2025;12:1523027.
13. Richard MJ, Driban JB, McAlindon TE. Pharmaceutical treatment of osteoarthritis. Osteoarthritis Cartilage. 2023;31:458-66.
14. Staff U. Nutraceutical treatment in knee osteoarthritis. Open J Orthop. 2022;12:303-26.
15. Zhou Y, Zhang Y, Dai H, Zhang Y, Fu Y. The potential of undenatured type II collagen against arthritis: a review. Collagen Leather. 2024;6(1):17.
16. Luo C, Su W, Song Y, Srivastava S. Efficacy and safety of native type II collagen in modulating knee osteoarthritis symptoms: A randomised, double blind, placebo-controlled trial. J Exp Orthop. 2022;9(1):123.
17. Yatish DR, Naveenkumar D, Bilagi DA, Joshi D. Evaluation of clinical efficacy of undenatured type ii collagen in the treatment of osteoarthritis of knee. A randomized controlled study. Int J Orthop Sci. 2020;6(2):497-500.
18. Mehra A, Anand P, Borate M, Paul P, Kamble S, Mehta KD, et al. A non-interventional, prospective, multicentric real life Indian study to assess safety and effectiveness of un-denatured type 2 collagen in management of osteoarthritis. Int J Res Orthop. 2019;5:315-20.
19. Saini N, Rawat S, Saresa H, Mehta KD, Jain R. A cross-sectional survey of orthopaedicians to understand the prescribing pattern of disease modifying osteoarthritis drugs in osteoarthritis. Int J res Orthop. 2019;5:670-4.

Cite this article as: Khanna M, Mukherjee AN, Sarkar PS, Senthil V, Gupta R, Lakhar S. Clinical practice trends and therapeutic preferences in osteoarthritis management: a cross-sectional survey of orthopaedic surgeons in India. Int J Res Orthop 2025;11:1422-9.