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Current practices and perceptions among clinicians in osteoarthritis and osteoporosis management in Indian settings

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ABSTRACT

Background: Although there were several clinical studies available, there was a dearth of studies among clinicians in actual practice. So, the present study aimed to assess clinician perspectives on the prevalence, risk factors, diagnosis and management practices of osteoarthritis (OA) and osteoporosis (OP) in routine clinical settings, to identify gaps in awareness, treatment approaches and patient compliance.

Methods: The cross-sectional study utilized a 23-item questionnaire to gather expert insights on the management of OA and OP in Indian settings. It explored various aspects, including epidemiology, risk factors, diagnostic practices, treatment preferences and challenges in current management. The collected data were analysed using descriptive statistics.

Results: The study included 119 experts and nearly 75% of them identified knee OA as the most prevalent form of the condition. For the early management of OA, around 88% of respondents preferred a combination of nonsteroidal anti-inflammatory drugs (NSAIDs), physiotherapy, dietary modifications and exercise. Nearly 83% recognized family history, smoking, poor diet, advancing age and post-menopausal status as common risk factors for OP. Regarding screening practices, 55% of participants reported that blood tests, bone turnover markers and bone mineral density (BMD) assessments via ultrasound are the most commonly used methods. Around 77% believed that calcitriol supports fracture management, offers the benefit of weekly dosing for better compliance and is effective in treating OP. A majority (84.87%) of participants agreed that calcium aspartate is a well-tolerated and effective calcium supplement suitable for individuals across all age groups.

Conclusions: This study indicates that knee OA is the most commonly observed form, with early management favouring NSAIDs, physiotherapy, dietary modifications and exercise. In OP, lack of awareness remains a key treatment gap, while calcium aspartate and calcitriol are widely regarded as effective and well-tolerated options.

Keywords: NSAIDs, Osteoarthritis, Osteoporosis, Patient awareness, Risk factors, Treatment compliance

INTRODUCTION

Osteoarthritis (OA) and osteoporosis (OP) are the two most prevalent age-related skeletal disorders.[1] As of 2020, OA affected approximately 7% of the global population, equating to over 500 million individuals.[2] The global burden of OP is notably higher in females, with women bearing a burden 1.5 times greater than men in terms of incidence and disability-adjusted life years (DALYs).[3] In India, OP tends to manifest 10–20 years earlier than in Western populations, placing a significant burden on both the health and economic system.[4] An estimated 61 million individuals in India are affected by OP, with women comprising approximately 80% of these cases.[4] The number of individuals with OA in India rose from 23.46 million in 1990 to 62.35 million in 2019.

DALYs from OA also surged from 0.79 million to 2.12 million, with OA ranking as the 20th leading cause of years lived with disability in 2019.[5] While OA affects all age

groups, it is most common among older adults and women. With an ageing population and rising obesity rates, the prevalence of OA is expected to escalate further.[6] This trend has prompted a strategic shift from traditional palliative care to early prevention approaches.[7]

Paracetamol is widely used for its analgesic and antipyretic properties, primarily acting through central mechanisms and selective inhibition of cyclooxygenase (COX)-3.[8] Unlike traditional nonsteroidal anti-inflammatory drugs (NSAIDs), paracetamol lacks significant peripheral anti-inflammatory effects, which contributes to its favorable safety profile.[9] Tramadol, a centrally acting opioid analgesic, binds to CNS opiate receptors and is metabolized by cytochrome P450 (CYP) 2D6 into a more potent active metabolite (M1).[10]

The combination of tramadol and paracetamol offers synergistic analgesia through multiple mechanisms, improves efficacy, reduces the required doses and enhances tolerability and compliance in OA pain management.[11] Calcium aspartate, a calcium salt of the amino acid aspartic acid, plays a key role in enhancing bone mineral density (BMD) by improving calcium bioavailability and supporting bone remodeling processes. It is considered a well-tolerated and effective calcium supplement suitable for a wide age range, particularly beneficial in the management of OP.[12]

Despite the availability of various treatment options, clinical management of OA and OP in Indian settings remains suboptimal due to late diagnosis, underreporting of symptoms, inadequate patient education and inconsistent adherence to treatment protocols.[13] Early diagnosis, appropriate treatment and patient adherence remain crucial to improving outcomes, yet variations in clinical practice and awareness continue to pose challenges.[14]

Although there were several clinical studies available, there was a dearth of studies among clinicians in actual practice. So, this study aims to assess clinician perspectives on the prevalence, risk factors, diagnostic strategies and management practices of OA and OP in routine clinical settings.

By gathering insights from practicing clinicians across India, the study aims to identify existing gaps in awareness, therapeutic approaches and patient compliance.

METHODS

Study settings

A cross-sectional study was carried out among clinical specialists involved in the management of OA and OP in the major Indian cities from June 2024 to December 2024. The study was conducted after getting approval from Bangalore Ethics, an Independent Ethics Committee, which was recognized by the Indian Regulatory Authority, the Drug Controller General of India.

Study participants

An invitation was sent to leading clinicians in managing OA and OP in the month of March 2024 for participation in this Indian survey. About 119 clinicians from major cities of all Indian states, representing the geographical distribution, shared their willingness to participate and provide necessary data.

Study procedure

The questionnaire booklet titled INDIGO (An Indian Expert Perspective Study in the Management of Osteoporosis and Osteoarthritis) study was sent to the clinicians who were interested in participating in the survey. The INDIGO study questionnaire comprised 23 questions designed to gather information on the prevalence, risk factors, diagnostic strategies and management practices of OA and OP in routine clinical settings. Clinicians had the option to skip questions as desired and were instructed to complete the survey independently, without peer consultation. Before participating in the survey, all respondents provided written informed consent.

Statistical analysis

Descriptive statistics were used to analyze the data, with categorical variables presented as frequencies and percentages. Visual representations, including graphs and pie charts, were created using Microsoft Excel 2013 (version 16.0.13901.20400) to illustrate the distribution of responses.

RESULTS

Out of 119 participants, more than half (52.94%) of the clinicians reported that 21–30% of patients in their clinical practice have OA. About 45% of clinicians identified natural aging as the primary causative factor in the development of OA. According to 49% of respondents, OA with co-morbid obesity is more commonly observed in women. Approximately 42% stated that the 40–49 years age group is the most commonly diagnosed with OA. As per 75% of the experts, knee OA is the most common form of the condition (Figure 1). Around 60% opined that 11–20% of patients in their practice have glucocorticoid-induced osteoporosis (GIOP) (Figure 2). About 88% of the participants stated that NSAIDs, physiotherapy, diet and exercise are preferred for the early management of OA (Figure 3).

According to 32% of experts, 21–30% of newly diagnosed OA patients require joint replacement therapy. Approximately 39% reported that paracetamol and tramadol offer faster and longer-lasting pain relief. Nearly 36% of clinicians indicated that 11–20% of patients with

co-morbid OP and OA are seen in practice. Around 43% stated that 21–30% of patients with both OP and OA are compliant with medication and follow-up consultations.

Nearly 42% of participants reported that individuals with OP have at least one fractured bone. About 40% indicated that more than 10% of patients with OP experience a fracture due to exercise.

According to 41% of clinicians, men above the age of 60 lose bone at the same rate as women. The majority of respondents (83%) stated that family history, smoking, poor or improper diet, age and post-menopausal status in women are common risk factors for OP (Figure 4).

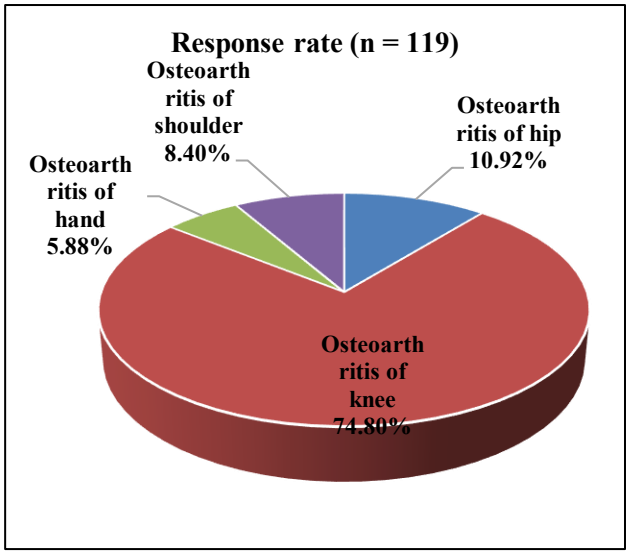

Figure 1: Distribution of responses to the most common type of OA observed in patients in routine settings.

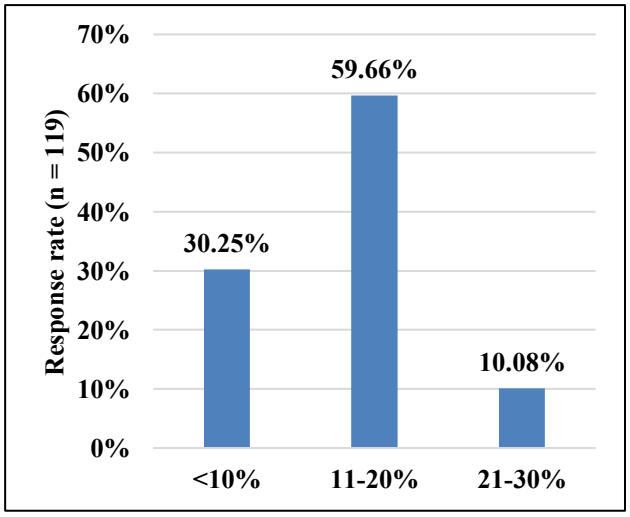

Figure 2: Distribution of responses to the estimated proportion of patients with GIOP in routine practice.

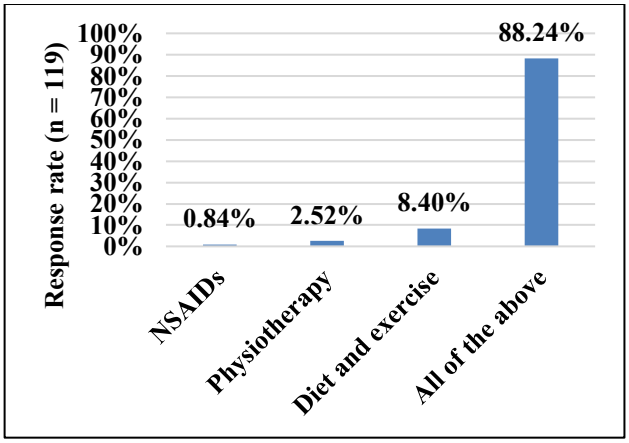

Figure 3: Distribution of responses to the preferred approaches for the early management of OA.

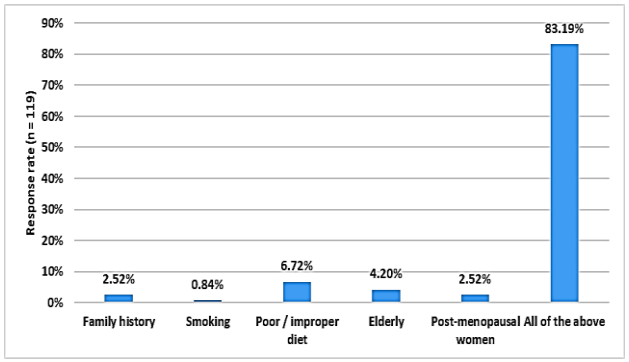

Figure 4: Distribution of responses to the opinion on common risk factors for OP.

According to 56% of the participants, blood tests, bone turnover marker measurements, dual-energy X-ray absorptiometry (DEXA) scans and BMD assessments via ultrasound are the most common screening methods for OP (Table 1). Around 43% of participants stated that a full blood count is not useful in evaluating secondary causes of OP. Nearly 45% of participants reported that 11–20% of individuals with OP experience vertebral compression fractures.

Approximately 50% stated that high body weight increases the risk of osteoporotic fractures. About 66% of participants identified a lack of awareness as a major limitation or gap in current OP treatment options (Table 2). According to 77% of clinicians, calcitriol helps in fracture management, offers a weekly dosage that improves patient compliance and is effective in managing OP (Table 3). Nearly 45% preferred calcium aspartate for 21–30% of patients in the management of OP. The majority of respondents (84.87%) opined that calcium aspartate is an effective and well-tolerated calcium supplement suitable for all age groups (Table 4).

Table 1: Distribution of responses to the most commonly used screening test for OP.

Tests	Response rate (n=119)
Blood test	0.84%
Dual-energy X-ray absorptiometry (DEXA) scan	20.17%
Bone turnover marker (BTM) measurements	0.84%
Bone mineral density (BMD) by ultrasound	23.53%
All of the above	54.62%

Table 2: Distribution of responses to the current limitations or gaps in the available treatment options for OP.

Limitations /gaps	Response rate (n=119)
Access to healthcare	10.08%
Affordability of medication	24.37%
Lack of awareness	65.55%

Table 3: Distribution of responses to views on calcitriol.

Views	Response rate (n=119)
Calcitriol helps in fracture management	3.36%
Weekly dosage makes it patient compliant	5.88%
Effective in osteoporosis management	13.45%
All of the Above	77.31%

Table 4: Distribution of responses to the use of calcium aspartate as a calcium supplement.

Opinion	Response rate (n=119)
Effective	1.68%
Well tolerated	6.72%
Can be given across all age groups	6.72%
All of the above	84.87%

DISCUSSION

The study highlighted key practice gaps and opportunities in the management of OA and OP in routine clinical settings. A substantial proportion of clinicians frequently encountered OA and GIOP in their practice and reported the need for joint replacement in a significant subset of patients, underscoring the importance of early and effective intervention. Regarding OP, the survey identified major risk factors such as a family history of osteoporosis, smoking, poor or insufficient diet, advancing age and postmenopausal status in women. A major challenge in the effective management of OP, as reported by participants, is the lack of patient awareness.

Most study participants indicated that knee OA is the most prevalent form of the condition. This aligns with findings by Primorac et al, who described OA as a widespread and progressive musculoskeletal disorder predominantly affecting weight-bearing joints such as the hips and knees.[15] Similarly, Tong et al described OA as a complex and heterogeneous disease that can involve multiple joints, including the knee, hip, lumbar facet joints and temporomandibular joint.[16] In agreement with these findings, Singh et al also reported knee OA as the most prevalent form in India, followed by hand OA.[5]

Many participants reported that 11–20% of patients in routine clinical practice are affected by GIOP in India. The majority of epidemiological data linking glucocorticoid therapy to increased fracture risk pertain to the use of oral glucocorticoids.[17] Similarly, Saag et al, described OP as one of the most predictable and debilitating complications of prolonged glucocorticoid treatment, leading to fractures in up to 50% of patients.[18] Specific prevalence data for GIOP in India are limited, highlighting the need for further research to accurately assess its impact within the population. The majority of survey participants indicated that NSAIDs, physiotherapy, dietary changes and exercise are commonly preferred for the early management of OA. According to Richard et al oral and topical NSAIDs, including COX-2 inhibitors, are strongly recommended as first-line treatments for OA because of their effectiveness in reducing pain and improving function.[19] Complementing pharmacologic therapy, Wang et al, emphasized the importance of initiating physical therapy early in the disease course to achieve optimal outcomes. However, the lack of standardized physiotherapy protocols in clinical practice contributes to variability in trial results

and inconsistent treatment efficacy. Moreover, patient acceptance of physical therapy remains suboptimal in some cases.[20]

Supporting lifestyle interventions, Thomas et al, reported that physical activity induces beneficial changes in white adipose tissue, such as enhanced mitochondrial biogenesis and a modified adipokine profile. As a result, weight management programs that combine both dietary modifications and exercise offer the greatest benefits, improving functional outcomes, joint imaging results and reducing pain as measured by visual analogue scales.[21] Most of the survey participants identified family history, smoking, inadequate or poor diet, advancing age and post-menopausal status in women as common risk factors for OP.

These observations are consistent with existing literature. According to Ratajczak et al, cigarette smoking is one of the most significant modifiable risk factors for OP. It also contributes to premature mortality, cancer and a range of chronic diseases.[22] Villiers further highlighted that the sharp decline in estrogen levels following menopause leads to accelerated bone resorption and a marked reduction in bone strength, substantially increasing the risk of OP in women.[23] These findings underscore the importance of targeted screening and preventive strategies in at-risk populations, particularly postmenopausal women and older adults.

Many participants indicated that blood tests, bone turnover markers, DEXA scans and BMD assessments using ultrasound are among the most commonly used screening methods for OP. In line with this, Inui et al, noted that the standard diagnostic approach for OP involves measuring BMD using DEXA at key skeletal sites such as the proximal femur, lumbar spine or forearm, with results compared against a reference population.[24] Yen et al, emphasized that while calcaneal quantitative ultrasonography (QUS) serves as a valuable prescreening tool, DEXA remains the gold standard in clinical practice for OP diagnosis.[25] Similarly, Ayub et al, reaffirmed that the diagnosis is primarily based on the measurement of BMD.[26]

Many participants identified a lack of awareness as a significant barrier to the effective management of OP. According to Ayub et al, although considerable progress has been made in diagnostic techniques and the availability of various treatment options, a substantial portion of the population remains undertreated or entirely untreated, despite the rising prevalence of the condition.[26] Kanis et al also highlighted a considerable therapeutic gap, particularly following fragility fractures. Their study found that fewer than 20% of patients receive treatment aimed at preventing future fractures within a year after the initial fracture. This gap is even more pronounced among the elderly, a group that would benefit most from timely intervention. Research indicates that as few as 10% of older women with fragility fractures receive any form of OP treatment, excluding estrogen therapy.[27]

The majority of participants agreed that calcitriol plays a beneficial role in fracture management, provides the convenience of a weekly dosage that supports better patient compliance and is effective in the treatment of OP. Tilyard et al reported that women treated with calcitriol showed a significant reduction in the incidence of new vertebral fractures during the second and third years of therapy.[28] Similarly, Peppone et al found that calcitriol notably enhanced bone formation, contributing to an overall increase in bone metabolism. However, they noted that suboptimal adherence to the exercise regimen may have limited its potential impact on bone health.[29]

Most respondents in the current survey recommended calcium aspartate as an effective and well-tolerated calcium supplement suitable for individuals across all age groups. In a previous survey by the current authors, approximately 72% of respondents identified calcium aspartate anhydrous as their preferred supplement for managing OP.[30] Tang et al, involving 1,306 participants with an initial T-score of -1.5 or lower, evaluated the effectiveness of calcium aspartate anhydrous in comparison to placebo, calcium citrate with vitamin D or dual placebos. The results demonstrated that over a period of 3 to 12 months, supplementation with calcium aspartate anhydrous led to a significant improvement in BMD.[31]

By addressing key domains such as prevalence, risk factors, diagnostic tools and current treatment practices, the present survey provides important insights that can assist policy development and improve the management of OA and OP. However, the limited sample size may affect the generalizability of the findings to broader healthcare settings. Additionally, reliance on self-reported data introduces the possibility of bias and the absence of detailed statistical analysis limits the depth of interpretation. Despite these limitations, the survey offers meaningful value in highlighting clinical trends and practice challenges.

CONCLUSION

The study highlights the high prevalence of knee OA and GIOP, with aging, obesity and menopause identified as key risk factors. Early OA management commonly involves NSAIDs, physiotherapy and lifestyle changes, while OP risk is linked to family history, smoking and poor nutrition. Despite the availability of treatments like calcitriol and calcium aspartate, gaps in patient awareness and adherence persist. These findings emphasize the need for standardized protocols, enhanced patient education and larger studies to optimize care outcomes.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Im GI, Kim MK. The relationship between osteoarthritis and osteoporosis. J Bone Miner Metab. 2014;32(2):101–9.
2. Hunter DJ, March L, Chew M. Osteoarthritis in 2020 and beyond: a Lancet Commission. Lancet. 2020;396(10264):1711–2.
3. Zhu Z, Yu P, Wu Y, Wu Y, Tan Z, Ling J, et al. Sex Specific Global Burden of Osteoporosis in 204 Countries and Territories, from 1990 to 2030: An Age-Period-Cohort Modeling Study. J Nutr Health Aging. 2023;27(9):767–74.
4. Hinda R, Valecha S, Kumar N, Walia JPS, Singh K, Sethi S, et al. Prevalence and Predictors of Osteoporosis and Osteopenia in Postmenopausal Women of Punjab, India. Int J Environ Res Public Health. 2022;19(5):2999.
5. 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 and Cartilage. 2022;30(8):1070–8.
6. Marshall DA, Liu X, Barnabe C, Yee K, Faris PD, Barber C, et al. Existing comorbidities in people with osteoarthritis: a retrospective analysis of a population-based cohort in Alberta, Canada. BMJ Open. 2019;21;9(11):33334.
7. Kraus VB, Sun S, Reed A, Soderblom EJ, Moseley MA, Zhou K, et al. An osteoarthritis pathophysiological continuum revealed by molecular biomarkers. Sci Adv. 2022;10(17):6814.
8. Graham GG, Davies MJ, Day RO, Mohamudally A, Scott KF. The modern pharmacology of paracetamol: therapeutic actions, mechanism of action, metabolism, toxicity and recent pharmacological findings. Inflammopharmacology. 2013;21(3):201–32.
9. Anderson BJ. Paracetamol (Acetaminophen): mechanisms of action. Pediatric Anesthesia. 2008;18(10):915–21.
10. Dhesi M, Maldonado KA, Patel P, Maani CV. Tramadol. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025.
11. Husic S, Izic S, Matic S, Sukalo A. Efficacy and Safety of a Fixed Combination of Tramadol and Paracetamol (Acetaminophen) as Pain Therapy Within Palliative Medicine. Mater Sociomed. 2015;27(1):42–7.
12. Tang IF, Liu H, Wang Q, Bai XS, Lou T. Effects of Calcium Aspartate Anhydrous on Treatment of Osteoporosis. Available at: https.ezorbcalcium.com.
13. Desai HA, Shah RB, Shah H, Thakkar K. Prevalence and medicinal practices for osteoarthritis in Western India. Natl J Physiol Pharm Pharmacol. 2021;11(1):78-83.
14. LeBoff MS, Greenspan SL, Insogna KL, Lewiecki EM, Saag KG, Singer AJ, et al. The clinician's guide to prevention and treatment of osteoporosis. Osteoporos Int. 2022;33(10):2049–102.
15. Primorac D, Molnar V, Rod E, Jeleč Ž, Čukelj F, Matišić V, et al. Knee Osteoarthritis: A Review of Pathogenesis and State-Of-The-Art Non-Operative Therapeutic Considerations. Genes. 2020;11(8):854.
16. Tong L, Yu H, Huang X, Shen J, Xiao G, Chen L, et al. Current understanding of osteoarthritis pathogenesis and relevant new approaches. Bone Res. 2022;20;10(1):1–17.
17. Ilias I, Milionis C, Zoumakis E. An overview of glucocorticoid-induced osteoporosis. Endotext. 2022.
18. Saag KG, Emkey R, Schnitzer TJ, Brown JP, Hawkins F, Goemaere S, et al. Alendronate for the prevention and treatment of glucocorticoid-induced osteoporosis. Glucocorticoid-Induced Osteoporosis Intervention Study Group. N Engl J Med. 1998;339(5):292-9.
19. Richard MJ, Driban JB, McAlindon TE. Pharmaceutical treatment of osteoarthritis. Osteoarthritis and Cartilage. 2023;31(4):458–66.
20. Wang W, Niu Y, Jia Q. Physical therapy as a promising treatment for osteoarthritis: A narrative review. Front Physiol. 2022;13:1011407.
21. Thomas S, Browne H, Mobasheri A, Rayman MP. What is the evidence for a role for diet and nutrition in osteoarthritis. Rheumatology (Oxford). 2018;57(4):61–74.
22. Ratajczak AE, Szymczak-Tomczak A, Rychter AM, Zawada A, Dobrowolska A, Krela-Kaźmierczak I. Impact of cigarette smoking on the risk of osteoporosis in inflammatory bowel diseases. J Clin Med. 2021;10(7):1515.
23. de Villiers TJ. Bone health and menopause: Osteoporosis prevention and treatment. Best Pract Res Clin Endocrinol Metab. 2024;38(1):101782.
24. Inui A, Nishimoto H, Mifune Y, Yoshikawa T, Shinohara I, Furukawa T, et al. Screening for osteoporosis from blood test data in elderly women using a machine learning approach. Bioengineering. 2023;10(3):277.
25. Yen CC, Lin WC, Wang TH, Chen GF, Chou DY, Lin DM, et al. Pre-screening for osteoporosis with calcaneus quantitative ultrasound and dual-energy X-ray absorptiometry bone density. Sci Rep. 20213;11(1):15709.
26. Ayub N, Faraj M, Ghatan S, Reijers JAA, Napoli N, Oei L. The Treatment Gap in Osteoporosis. J Clin Med. 2021;10(13):3002.
27. Kanis JA, Svedbom A, Harvey N, McCloskey EV. The Osteoporosis Treatment Gap. J Bone Mineral Res. 2014;29(9):1926–8.
28. Tilyard MW, Spears GF, Thomson J, Dovey S. Treatment of postmenopausal osteoporosis with calcitriol or calcium. N Engl J Med. 1992;326(6):357–62.
29. Peppone LJ, Ling M, Huston AJ, Reid ME, Janelsins MC, Puzas JE, et al. The Effects of High-dose Calcitriol and Individualized Exercise on Bone Metabolism in Breast Cancer Survivors on Hormonal

Therapy: A Phase II Feasibility Trial. Support Care Cancer. 2018;26(8):2675–83.
30. Manjula S, Krishna Kumar M. Expert opinion on the clinical use of calcium and vitamin D supplements in osteoporosis in Indian settings. Int J Res Orthopaed. 2024;10(2):364–8.

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