Retrospective analysis of Clinical Presentation and Pharmacotherapy of Osteoporosis in an Orthopaedic Tertiary Care Hospital.

Abstract

Background

Osteoporosis is a chronic metabolic bone disease characterized by reduced bone mass and increased fracture risk, predominantly affecting postmenopausal women and the elderly. Owing to its silent progression, the condition often remains underdiagnosed. Drug utilization studies provide insight into real-world prescribing practices and help promote rational pharmacotherapy. This study aimed to evaluate the clinical profile and prescribing pattern of drugs used in the management of osteoporosis in a tertiary care orthopaedic setting.

Materials and Methods

A retrospective observational study was conducted from August 2023 to April 2024 in the Department of Orthopaedics at a tertiary care teaching hospital in Maharashtra, India. A total of 180 patients aged 18 years and above with a confirmed diagnosis of osteoporosis were included. Data regarding demographic characteristics, clinical presentation, and pharmacological treatment were collected from medical records using a structured data collection form. Descriptive statistical analysis was performed.

Results

Among the 180 patients, 162 (90%) were females and 18 (10%) were males. The majority belonged to the 56–75 years age group (53.8%). Back pain was the most common presenting complaint (71.67%), followed by hip and knee pain. A total of 656 drugs were prescribed, with an average of 3.64 drugs per prescription. Non-steroidal anti-inflammatory drugs were the most frequently prescribed class (26%), followed by calcium and vitamin supplements (23.93%) and antacids (20.27%).

Conclusion

Osteoporosis was more prevalent among elderly females, with musculoskeletal pain being the predominant symptom. Management primarily focused on symptomatic relief using NSAIDs along with calcium and vitamin supplementation. Emphasis on rational, guideline-based therapy is necessary to improve long-term clinical outcomes.

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Keywords

Osteoporosis, Drug utilization, Prescribing pattern, Orthopaedic patients, NSAIDs

Introduction:-

Osteoporosis is a chronic metabolic bone disease that predominantly affects postmenopausal women and the elderly population. It is characterized by reduced bone mass and deterioration of bone microarchitecture, resulting in decreased bone mineral density and an increased susceptibility to fractures.[1] Due to the asymptomatic nature of early bone loss, osteoporosis is often referred to as a "silent disease."[2] Fractures associated with osteoporosis typically occur following minimal trauma and are therefore classified as fragility fractures.[3] The disease arises from an imbalance between bone resorption and bone formation, favoring excessive osteoclastic activity.[1]

Female sex is a well-established risk factor for osteoporosis. During the reproductive years, skeletal integrity is maintained through a tightly regulated balance between osteoblastic bone formation and osteoclastic bone resorption.[4] However, estrogen deficiency during premature or postmenopausal states leads to a significant increase in osteoclast-mediated bone resorption, resulting in accelerated bone loss.[5] Globally, approximately one-third of women over the age of 50 years are at risk of developing osteoporosis.[6] In India, the prevalence of osteoporosis among women aged above 50 years is estimated to be nearly 20%, accounting for approximately 46 million affected individuals.[7]

Despite abundant sunlight exposure, osteoporosis remains highly prevalent in India due to contributory factors such as widespread vitamin D deficiency, early onset of menopause, suboptimal nutritional intake, and lifestyle-related factors.[8] Although several diagnostic modalities are available, osteoporosis frequently remains underdiagnosed owing to the absence of early clinical manifestations.[2] Furthermore, dual-energy X-ray absorptiometry, the gold standard for diagnosis, is often limited by high cost and restricted accessibility, particularly in low-resource settings.[9] These challenges contribute to delayed diagnosis and inadequate management of osteoporosis.[10]

Prescription pattern and clinical profiling studies are valuable tools for assessing drug utilization trends and prevailing therapeutic practices in routine clinical settings.[11] Such studies facilitate comparison between actual prescribing patterns and established treatment guidelines and help identify areas of irrational or suboptimal drug use.[12] Additionally, these evaluations support rational pharmacotherapy by promoting safe, effective, and evidence-based treatment strategies.[13] In this context, the present study was undertaken to evaluate the prescribing pattern of drugs used in the management of osteoporosis in a tertiary care teaching hospital.

MATERIALS AND METHODS

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A retrospective observational study was conducted over a period of eight months, from August 2023 to April 2024, in the Department of Orthopedics at MGM Medical College and Hospital, chh. Sambhajinagar of Maharashtra state in India. Prior approval for the study was obtained from the Institutional Ethics Committee before initiation of data collection.

The minimum sample size required for the study was calculated to be 180 patients. This estimation was based on the total number of hospital admissions during the study period and findings from a pilot study conducted prior to commencement of the main study. Patients of either sex, aged 18 years and above, with a documented diagnosis of osteoporosis were included. Patients with incomplete medical records, those with severe or life-threatening comorbid conditions, as well as pregnant and lactating women, were excluded from the study.

A structured and predesigned data collection form was developed in accordance with the study objectives. The form comprised three sections: (a) demographic characteristics of the patients, (b) clinical presentation including signs, symptoms, laboratory parameters, and confirmed diagnosis, and (c) details of pharmacological management, including drugs prescribed for osteoporosis and concomitant medications used for associated comorbidities.

Relevant data were extracted from patient treatment records obtained through the hospital's Medical Records Department. Data collection was carried out on a daily basis and was independently cross-verified to ensure accuracy and completeness. Information pertaining to clinical findings, laboratory investigations, and pharmacotherapy—including drug name, dosage form, dose, frequency, route of administration, duration of therapy, and total number of drugs prescribed per patient—was systematically recorded.

The collected data were analyzed using descriptive statistical methods. Quantitative variables such as age were expressed as mean and standard deviation, while categorical variables including gender and prescribing patterns were summarized using frequencies and percentages.

Results

The study included a total of 180 patients diagnosed with osteoporosis over the last three years. A detailed evaluation of the data collected revealed that 162 (90%) were females and only 18 (10%) were males, suggesting higher prevalence of osteoporosis among female patients. All patients were classified into three groups based on their age in years. Out of which, osteoporosis was found more prevalent among patients in the age category of 56-75 years, accounting for n = 97 (53.8%) cases. The second most prevalent age group was 35-55 years, n=62 (34.44%), and the least number of cases were diagnosed in the age group of 76-95 years, n=21 (11.67%).

Distribution of Patients based on their Chief Complaints During the Hospital Admission

The findings of our reveal that, out of the total patients enrolled, n=129 (71.67%) had complaints of back pain followed by hip pain, n=21 (11.67%) and knee pain, n=18 (10.0%). The patients complaining of wrist pain were the least in the study, n=2 (1.1%). Table 1 elaborately discusses the complaints of the patients on admission

Table 1: Distribution of patients based on their complaints during the hospital admission.

Complaints on admission	Frequency (n)	Percentage (%)
Back pain	129	71.67

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Hip pain	21	11.67
Knee pain	18	10.00
Multiple joint pain	15	8.33
Lower limb pain	7	3.88
Neck pain	5	2.77
Shoulder pain	3	1.66
Wrist pain	2	1.11

Distribution of Patients based on the Details of Drugs Prescribed to Treat Osteoporosis

The study results showed that the total number of drugs prescribed to treat osteoporosis were n=656 among 180 patients, with an average of3.64 drugs per prescription. It was observed that non-steroidal anti- inflammatory drugs (NSAIDs) were prescribed among the majority, n=175 (26%), followed by calcium and Vitamin combinations, n=157 (23.93%) and antacids among n=133 (20.27%) patients. Muscle relaxants were the least prescribed, n=33 (5.03%). The details of classes of medications prescribed in the study are depicted in Table 2

Table 2: Distribution of patients based on the details of drugs prescribed to treat osteoporosis.

Drugs	Frequency (n)	Percentage (%)
NSAIDs	175	26.67
Calcium and Vitamin combination	157	23.93
Antacids	133	20.27
Vitamin	109	16.61
Miscellaneous drugs	49	7.46
Muscle relaxant	33	5.03
Total	656	100

DISCUSSION

In this study, the occurrence of osteoporosis was found to be higher among females (90 %), outweighing the males (10%). A study conducted by Tripathy A et al. and Van der Velde RY et al. also showed similar results, where the prevalence was of around 90% among the females and 10% among the males.12,13 Our study results revealed that a maximum number of patients belonged to the age category of 56-75 years, which had similarity with the study results of Augustine AM et al. where the mean age of the patient was 50-60 years. Another study carried out by Tripathy A et al. also reported that the cases found above the age of 50 years topped the list.12,14 In our study, the most common symptom and the reason for hospital admission was back pain, difficulty in walking, difficulty in lifting an object, and hip pain. This can be attributed to the negative calcium balance and weakness of vertebra and

other large bones. A study by Tripathy et al. and Ryan P.J et al. showed similar results by reporting 89% incidence of back pain among their study population.12,15 In our study, the most commonly prescribed drugs were NSAIDS, calcium and Vitamins combination and antacids. These results are in accordance with a study conducted by Tang BM et al. which showed that calcium or calcium combined with Vitamin D were used for the therapy of osteoporosis with combinations of NSAIDs.16 Research conducted by Augustine AM et al.14 also had similar results, where frequently prescribed drugs were NSAIDs, Antiulcer agents, calcium supplements and multi - Vitamins.But, contradictory results were reported in a study conducted by Hajcsar EE et al.17 Where bisphosphonates were the commonly used drug. The pain presented by the patients during their hospital admission can justify the use of NSAIDs in the current study. A study conducted by Murray W et al.18 showed that continuous treatment with Vitamin D in postmenopausal osteoporotic women for three years decreased the incidence of vertebral fractures. Another similar study focused on rationalizing the use of Vitamin D and calcium to reduce the symptoms.12 Paracetamol, tramadol, aceclofenac were the most commonly prescribed analgesic drugs in research conducted by Vestergaard P et al.19 Even though NSAIDs have no role to play with respect to the bone mineral density, they were used in the study for obtaining a better control over the prevailing symptoms. Some medications used in the treatment of osteoporosis can cause gastric problems including gastric irritation, bloating, oesophageal ulcer and gastric ulcer. This might be the reason for the excess use of antacid in the treatment of osteoporosis. The excessive use of antacid and proton pump inhibitors was noted in a study conducted by Targownik LE et al.20 The same study reported that the risk of osteoporosis increases with excessive and long-term use of proton pump inhibitors. Their results also revealed that the patients who were not on proton pump inhibitors had increased bone mineral density than patients on therapy with proton pump inhibitors.

CONCLUSION

The present study showed that females were most commonly diagnosed with osteoporosis. The most frequently reported clinical symptoms were back, hip and knee pain. The complaints were treated with NSAIDs and calcium and Vitamin supplements. These drugs were co-prescribed with gastro-protective agents. Several non-pharmacological therapies such as strict exercise were advised to these patients. The cumulative impact of these therapies is expected to significantly improve the patient's quality of life, shorten the frequency of hospital visits and the incidence of long term complications.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS

NSAIDs: Non-steroidal anti-inflammatory drugs.

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