



Research Article

Prevalance Of Osteopenia and Osteoporosis in Orthopaedic Clinics in Central India: An Analysis

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ABSTRACT

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Background: Prevalence of osteopenia and osteoporosis cases are increasing in developing countries like India. Early detection by BMD (Bone Mineral Density) and management by orthopaedic surgeons gives better outcomes. Few studies are available in India to prove osteoporosis and management by orthopaedic clinics. Aim of study was to determine prevalence of osteopenia and osteoporosis in patients attending orthopaedics clinics, outpatient department in central India.

Methods: This was prospective study where total 1215 patients were screened for BMD (Bone Mineral Density) screening camps were conducted on fourth Wednesday of every month from May 2022 to May 2025 at Reliable Multispeciality Hospital Nagpur Maharashtra. Patients were grouped into young adults (18-59) and elderly (>59 years). Patients were categorized as per WHO's diagnostic categories (WHO BMD categories): a T-score >-1 was designated as normal BMD, a T-score \leq -1.0 to >-2.5 as osteopenia, and a T-score \leq -2.5 as osteoporosis

Results: Prevalence of osteopenia and osteoporosis in our study was found to be (66.42%) and (6.01%) respectively in all the age groups. Women had more prevalence of osteoporosis (6.78%), while men had only (4.75%). Osteopenia was more prevalent in men (74.95%) than women (61.17%). Osteopenia, was most frequently seen among younger adults at 79.8%, and older adult population 67.9%.

Conclusion: Present study found a high prevalence of osteopenia in the age group of 18-59 years. Osteoporosis affects predominantly older (>59 yrs) age group and higher in Females. Hence, we recommend extending routine screening for BMD in middle aged orthopaedic outpatients.

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Keywords: Osteoporosis, Osteopenia, BMD (Bone Mineral Density), T-Scores, calcaneal quantitative ultrasound (QUS), Orthopaedic Clinics, Central India.

INTRODUCTION

Number of patients of osteoporosis and osteopenia are increasing in recent practice attending orthopaedics clinics, outpatient department even though osteoporosis is considered as Silent Metabolic Disease¹. World Health Organization (WHO) categorizes bone loss based on bone mineral density (BMD) as osteoporosis with BMD T-score of <-2.5 standard deviation (SD) and as osteopenia with BMD T-score of -1.0 to -2.5 SD below the average value for young healthy women.² Osteoporosis is divided into primary and secondary. Primary osteoporosis can be seen in all age groups however secondary osteoporosis can be seen due to chronic medications like steroids and deficiency of vitamin D and hormonal Disorders. Globally, nearly 200 million people suffer from osteoporosis each year. The 2011 population census reports that nearly 104 million (>60 years) (53 million females and 51 million males) elderly are present in India which represent 8.6% of total population. Life expectancy of Indians at the age of 60 years is reported to be 18 years¹⁰. In India from various studies prevalence of osteoporosis among women is 8 to 62%.³ Prevalence of osteopenia found to be higher in women (40.3%) than men (29.9%).⁴ Osteoporosis leads to early fragility fractures among adult and elderly age group with increasing mortality and morbidity⁵. It is necessary to diagnose osteoporosis early and treat it, as beneficial effect of treatment takes about six-month time after initiating treatment.

American Orthopaedic Association (AOA) introduced 'Own the Bone' programme, hence orthopaedic surgeons can play vital and key role in early diagnosis of osteoporosis and fracture treatment which resulted in better management of patients⁶⁻⁹. Few studies are available in central India to demonstrate prevalence of osteoporosis in patients attending orthopaedics

clinics, outpatient department so we decided to go ahead with this study to find out prevalence of osteopenia and osteoporosis in patients attending orthopaedics clinics, outpatient department in central India.

MATERIAL AND METHODS

This was prospective study where BMD (Bone Mineral Density) screening camps were conducted on fourth Wednesday of every month from May 2022 to May 2025. Fourth week and Wednesday was fixed to keep continuity and easy to conduct camps in patient attending orthopaedics clinics, outpatient department at Reliable Multispeciality Hospital Nagpur Maharashtra. Ethical clearance was obtained and informed consent was taken from all patients being recruited for screening for BMD. exclusion criteria were as below.

- Patients with trauma to the left ankle/foot or fractures of lower limbs or pelvis
- Patients with medical comorbidities who were on chronic medications
- patients taking drugs affecting bone health
- pregnant and lactating females

Procedure

The patient’s left foot was kept in flush with the foot rest in the machine so that the scan was performed at the level of mid-calcaneus. Assessment was performed automatically by the machine within 20 seconds. Quality assurance test for the device was performed on each day of screening. The BMD was carried out by a single technician in all the patients through study period. The machine automatically converted the BMD values of the patients into T-Scores¹¹. Total 1215 patients were screened for BMD. Patients were grouped into young adults (18-59) and elderly (>59 years). As a simple, non-invasive method without risk of radiation exposure, the calcaneal quantitative ultrasound (QUS) is considered as promising tool for detecting osteoporosis in routine clinical practice¹². Further, measurement of peripheral BMD has been shown to correlate with central BMD¹³. Some authors identify that axial densitometry examination is not superior to calcaneal ultrasound evaluation¹⁵. Absolute numbers and proportions of normal, osteopenic and osteoporotic patients per age group were evaluated according to the WHO’s diagnostic categories (WHO BMD categories): a T-score >-1 was designated as normal BMD, a T-score ≤-1.0 to >-2.5 as osteopenia, and a T-score ≤-2.5 as osteoporosis 12.

Statistical Methods: Pearson chi square test, p=<0.001.

RESULTS

Total 1215 participants were included in the study with mean age of 46.54± 14.78 years ranging from 13 to 94 years. More than half of the participants (50.33%) were aged 36-59 years, making this the largest age group participated in the study. About 26.52% were younger than 35 years, while 23.52% were older than 60 years. In terms of sex Distribution, females constituted the majority of the study population (61.90%), whereas males accounted for 38.10% of the participants (Table 1).

The distribution of bone mineral density (BMD) among participants found that the osteopenia was the most common condition, observed in 807 participants (66.42%) while osteoporosis was identified in 73 participants (6.01%) (Figure 1).

The distribution of bone mineral density (BMD) status varied significantly across age groups. Osteopenia, was most frequently seen among younger adults at 79.8% (257/322; <35 years), and older adult population 67.9% (414/611; 36-59 years). Conversely, osteoporosis was infrequent in younger strata at 1.6% (5/322; <35 years) and 3.4% (21/611; 36-59 years) but increased significantly to 16.8% (47/282) in those aged >60 years (Table 3).

The distribution of bone mineral density (BMD) status differed significantly across gender ($\chi^2 = 24.49$, p < 0.001). Normal BMD was more prevalent among females at (241/752) compared to males (94/463). Osteopenia, the most common category overall (66.42%; 807/1215), predominated in males at 74.95% (347/463) versus 61.17% (460/752) in females. Osteoporosis occurred more significantly among females at 6.78% (51/752) than in males at 4.75% (22/463) (Table 4).

Table 1: Distribution of age and sex of the participants

Categories	Frequency	Percentages
Age		
≤35 years	322	26.52
36-59 years	611	50.33
≥ 60 years	282	23.51
Mean age + SD	46.54 + 14.78	
Range	13- 94 years	
Sex		
Male	463	38.10
Female	752	61.90

Table 2: Distribution of Bone Mineral Density among study participant

Categories	Frequency	Percentages
Normal	335	27.57
Osteopenia	807	66.42
Osteoporosis	73	6.01

Table 3: Bone Mineral Density status of the participants according to Age

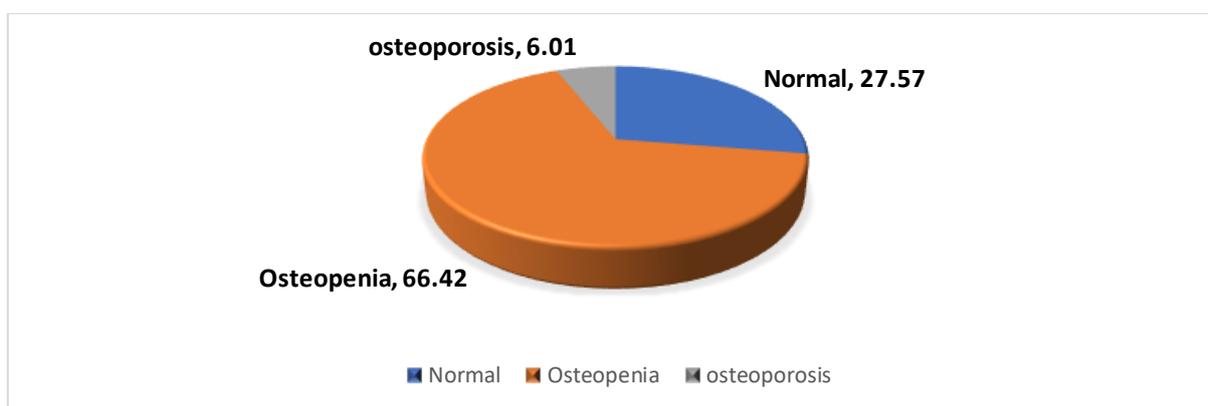
BMD status	Normal	Osteopenia	Osteoporosis	Total
Age				
<35 years	60 (18.63%)	257 (79.81%)	5 (1.55%)	322
36-59 years	176 (28.80%)	414 (67.87%)	21 (3.44%)	611
≥ 60 years	99 (35.10%)	136 (48.22%)	47 (16.79%)	282
Total	335 (27.57%)	807 (66.42%)	73 (6.01%)	1215

Pearson chi square test= 109., p=<0.001

Table 4: Bone Mineral Density status of the participants according to Gender

BMD status	Normal	Osteopenia	Osteoporosis	Total
Gender				
Male	94 (20.30%)	347 (74.95%)	22 (4.75%)	463
Female	241 (32.05%)	460 (61.17%)	51 (6.78%)	752
Total	335 (27.57%)	807 (66.42%)	73 (6.01%)	1215

Pearson chi square test= 24.49, p=<0.001

**Fig 1: Distribution of Bone Mineral Density among study participant**

DISCUSSION

Developing country like India, where osteoporosis and osteopenia cases are increasing which leads to fragility fractures and increases financial burden on individuals^{5,16-17}. National Osteoporosis Risk Assessment (NORA) which showed that osteoporosis was associated with a fragility fracture risk approximately four times that in normal BMD while osteopenia was associated with a 1.8-fold higher rate²⁵. India is second largest country in the world where life expectancy of individuals is predicted to be 18 yrs at the age of 60¹⁰. Early occurrence of osteopenia and further osteoporosis leads to fragility fractures and hence early identification of osteopenia and osteoporosis is essential to reduce the burden of fractures^{5,18}. According to International Society for Clinical Densitometry (ISCD) guidelines, BMD screening is routinely to be done in women aged 65 or older. The National Osteoporosis Foundation (NOF) also recommends bone density screening for all women aged 65 years or older and all men aged 70 years or older and so do some of the other studies^{21,22}. Prevalence of osteoporosis & osteopenia from various studies from India varies from 8% - 62% and >50% respectively^{5,18-20}. Present study Prevalence of osteopenia and osteoporosis were found to be (66.42%) and (6.01%) respectively in all the age groups, which also supports need of early screening for BMD. In our study Osteopenia, was most frequently seen among younger adults at 79.8%, and older adult population 67.9%. which is consistent finding with various previous studies done in India & worldwide^{1,3,5,6,11,17,19}.

Increased prevalence of osteopenia in present study and the other Indian studies, compared to other study populations could be explained by genetic susceptibility of Indian population for osteoporosis, high risk of hypovitaminosis D in Indians due to higher 25(OH)-d-24-hydroxylase enzyme and dark pigmentation of their skin which reduces the effect of sunlight exposure. The other factors are their changing life style (alcohol consumption, smoking, and lack of physical exercise), inadequate calcium intake etc. Vitamin D deficiency is an important risk factor for the development of osteoporosis in all age group^{23,24}. Hypovitaminosis D adversely affects calcium metabolism, osteoblastic activity, matrix ossification, bone remodelling, and hence bone mineral density. Indian diets are mostly vegetarian, and the consumption of dairy products is minimal in the lower socioeconomic population. So, it is recommended to consume diets rich in calcium, encourage physical exercise and adequate sun light exposure. Prevalence of osteoporosis more in elderly women than in men due to

the fact that women have lower BMD to begin with, and the bone loss that occurs with ageing occurs more rapidly, especially after menopause when the protective effect of oestrogen starts to fade²⁶.

Strength of present study is that all participants were above 18 yrs male and females were included, who attends orthopaedics clinics for various pains. However, it was scheduled on particular calendar day of every month so daily or routine patients could miss to participate in the present study

The present study, confirms that the prevalence of osteopenia and osteoporosis in middle aged male and female is so far under-recognised. Prevalence of osteoporosis is more in elderly females than males.

CONCLUSION

- Present study found a high prevalence of osteopenia in the age group of 18-59 years.
- Osteoporosis affects predominantly older (>59 yrs) age group and higher in Females.
- we recommend extending routine screening for BMD in middle aged orthopaedic outpatients.

Competing interests: “The author(s) declare that they have no competing interests”.

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