# Original Research Article

# Study of prevalence of osteoporosis in males of above 40 years age group attending SMS Hospital, Jaipur

## Parwez Qureshi*, R. C. Meena, Jakir Husain, Gaurav Deshwar, Vineet Maheshwari, Lakhpat Yadav

Department of Orthopaedics, SMS Medical College and Hospital, Jaipur, Rajasthan, India

**\*Correspondence:**
Dr. Parwez Qureshi,
E-mail: researchoraclebikaner@gmail.com

## ABSTRACT

**Background:** Whenever osteoporosis is discussed, the focus is on women; men are far less likely to receive a diagnosis of osteoporosis or osteoporotic fracture because of considerable gaps in knowledge on male osteoporosis. The aim and objectives were to study the prevalence of osteoporosis in males of above 40 year age group attending SMS Hospital Jaipur & to explore the influence of various modifiable and non-modifiable risk factors on BMD.
**Methods:** Study Location: SMS Medical College and Hospital, Jaipur. Study design: Hospital based cross sectional study. Study period: April 2015 to December 2016. Sample Size: 200. Work up: After taking ethical clearance and informed verbal consent, demographic and clinical details were noted along with S- calcium, Vitamin D and bone mineral density assessment. Osteoporosis was defined as T score $\leq -2.5$ bone mass $-1$ to $-2.5$ and normal as $> -1$. Data thus collected was analysed with help of SPSS 22.0 through frequency, percentages, Mean, SD and ANOVA.
**Results:** Prevalence of osteopenia and osteoporosis in the study population was 28.5% and 11.5%. Age wise maximum prevalence was in the age group 71-80 years (31.81%). Prevalence of osteoporosis was more among Muslim community 20.83%, more in low socio economic group (BPL). T score of study population was -0.3705±1.41. The mean BMI, S-Calcium, Vitamin D levels and T score values among osteopenic and osteoporotic patients were statistically highly significant when compared to patients without osteo-penic/porotic changes (p<0.05).
**Conclusions:** Osteoporosis is a silent killer and prevention is better than cure as prevention requires simple steps such as good dietary habits, active life style, good control of systemic disorders, reduced intake of tobacco and alcohol.

**Keywords:** Osteoporosis, T score, BMD

## INTRODUCTION

Worldwide, osteoporosis is a serious public health concern, estimated to affect over 200 million people.[1] Whenever osteoporosis is discussed, the focus is on women; men are far less likely to receive a diagnosis of osteoporosis or osteoporotic fracture because of considerable gaps in knowledge on male osteoporosis. WHO defines osteoporosis as a bone mineral density that is 2.5 standard deviations or more below the mean peak bone mass as measured by DEXA 'established osteoporosis' includes presence of fragility fractures.

Osteoporosis is a serious health problem in men but remains underdiagnosed and under-treated.[2] Osteoporotic fracture in men is commoner than myocardial infarction and prostate cancer. Osteoporosis and osteoporotic fractures increase with advancing age with loss of bone mineral density (BMD) at 1% per year.[3,4] An osteoporotic fracture may occur in one fifth men above 50 years age during their life time.[3,5]

In terms of symptomatology like back pain, kyphosis, height loss, and emotional difficulties, the clinical outcome of osteoporotic fracture in men is similar to

women; however, morbidity following hip fracture is profound in males, with over 50% of men requiring institutionalization and only 20% returning to their previous level of function. Contributing factors may be genetic determinants, several life-style related factors like physical activity, calcium intake, smoking, alcohol consumption, and vitamin D status may influence the bone mass in men.[6] However, the prevalence and influence of these factors may vary according to ethnicity.

Osteoporosis may add on to the economic burden in a developing country like India, where men may be the only earning members in many families.[7] The mortality after osteoporosis-related fracture is higher in men than women; mortality ratio after hip fracture was found to be 3.2 for men and 2.2 for women.[8] Despite being a common cause of morbidity and mortality in male, available data on male osteoporosis in Indian perspective are very few.

Therefore we planned a study to evaluate the prevalence of osteoporosis in healthy adult males of above 40 years of age without history of fractures as well as to study influence of risk factors.

### Aim and objectives

1. To study the prevalence of osteoporosis in males of above 40 year age group attending SMS Hospital Jaipur.
2. To explore the influence of various modifiable and non-modifiable risk factors on BMD.

## METHODS

### Study location

SMS Medical College and Hospital, Jaipur.

### Study design

Hospital based cross sectional study.

### Study period

April 2015 to December 2016

### Sample size

Sample size is calculated to be 194 subjects assuming prevalence of osteoporosis to be 8.5% (as per seed article) at 95% confidence interval and 4% absolute allowable error. Hence for study purpose 200 subjects were taken including males who were >40 years age without history of fractures and gave consent for study. Those who did not gave consent or <40 years, with previous history of fractures, hip replacement, kyphosis or scoliosis, either currently on bisphosphonates, thyroxine, steroids, immunosuppressive therapy,

antiepileptics, calcitonin, or any pre-existing fracture, malignancy, stroke, hemi/paraplegia, chronic kidney disease, chronic liver disease, rheumatoid arthritis, chronic obstructive pulmonary disease, organ transplantation, or bed ridden patients were excluded from study sample.

### Workup

All good clinical practice (GCP) guidelines were followed. The Ethical Review Board approved the study and informed consent was obtained from all subjects. Details regarding work up of patients including demographic and clinical details and history of smoking, alcohol intake, nutritional history, possible interfering diseases, and anthropometric parameters (height, weight, BMI, residential area, type of work, economic status as APL or BPL on the basis of BPL card were recorded. An overnight fasting blood sample was obtained for estimation of serum calcium (8.6–10.2 mg/dL), 25-hydroxy vitamin D (20–50 ng/mL) hereafter referred to as vitamin D. Vitamin D deficiency was defined as a vitamin D level of less than 20 ng/mL and a level less than 10 ng/mL was considered to indicate severe vitamin D deficiency. The vitamin D level was measured by Enzyme Immunoassay. BMD was assessed using the Hologic DXA QDR 4500 machine. The BMD was measured at the femoral neck of Right hip by the same technician. The WHO classification was used for categorization of BMD. Osteoporosis was defined as T score ≤−2.5 bone mass −1 to −2.5 and normal as ≥1. Data thus collected was analysed with help of SPSS 22.0 through frequency, percentages, Mean, SD and ANOVA was applied to detect any significant differences among general population, osteopenic and osteoporotic patients. P value <0.05 was considered to be statistically significant.

## RESULTS

Prevalence of osteopenia and osteoporosis in the study population was 28.5% and 11.5% respectively. Mean age of study population was 52.29 years. Maximum no. of subjects was of 40-50 year age group 33.50%. Age wise maximum prevalence was observed in the age group 71-80 years (31.81%). Prevalence of osteoporosis was more among Muslim community 20.83%, more in low socio economic group (BPL) 15.38%, more among individuals of height less than 165 cm 19.14%, more in individuals having body weight less than 60 kg 26.66%, low BMI, more in individuals with sedentary life style 24.39%. Osteoporosis was observed to be more prevalent in cases who were alcoholic (42.85%) and /or smokers (16.98%) (Table 1). T score of study population was -0.3705±1.41. The mean BMI, S-Calcium, Vitamin D levels and T score values when compared among patients with and without osteopenia and osteoporosis, the difference in mean levels was observed to be statistically highly significant (p<0.01) (Table 2).

**Table 1: Socio demographic factors of study population.**

| S. No. | Socio demographic factors | Normal (n =120) | Osteopenia (n =57) | Osteoporosis (n =23) |
|---|---|---|---|---|
| 1. | Age (years) | | | |
| | 40-50 (n =67) | 46 (68.65%) | 17 (25.37%) | 4 (5.97%) |
| | 51-60 (n =46) | 30 (65.21%) | 12 (26.08%) | 4 (8.69%) |
| | 61-70 (n =57) | 34 (59.64%) | 17 (29.82%) | 6 (10.52%) |
| | 71-80 (n =22) | 9 (40.90%) | 6 (27.27%) | 7 (31.81%) |
| | 81-90 (n =8) | 1 (12.5%) | 5 (62.5%) | 2 (25%) |
| 2. | Area | | | |
| | Rural (n =66) | 44 (66.66%) | 18 (27.27%) | 4 (6.06%) |
| | Urban (n =134) | 76 (56.71%) | 39 (29.10%) | 19 (14.17%) |
| 3. | Religion | | | |
| | Hindu (n =176) | 105 (59.65%) | 53 (30.11%) | 18 (10.22%) |
| | Muslim (n =24) | 15 (62.5%) | 4 (16.66%) | 5 (20.83%) |
| 4. | Socio economic status | | | |
| | APL (n =122) | 84 (68.85%) | 27 (22.13%) | 11 (9.01%) |
| | BPL (n =78) | 36 (46.15%) | 30 (38.46%) | 12 (15.38%) |
| 5. | Height (cms) | | | |
| | <165 (n =47) | 20 (42.55%) | 18 (38.29%) | 9 (19.14%) |
| | ≥165 (n =153) | 100 (65.35%) | 39 (25.49%) | 14 (9.15%) |
| 6. | Weight (kgs) | | | |
| | <60 (n =60) | 21 (35%) | 23 (38.33%) | 16 (26.66%) |
| | ≥60 (n =140) | 99 (70.71%) | 34 (24.28%) | 7 (5.0%) |
| 7. | BMI (Mean±SD) | 24.14±3.15 | 23.06±3.71 | 20.98±2.88 |
| 8. | Lifestyle | | | |
| | Heavy (n =71) | 40 (5.63%) | 26 (36.61%) | 5 (7.04%) |
| | Sedentary (n =41) | 19 (46.34%) | 12 (29.26%) | 10 (24.39%) |
| | Moderate (n =88) | 61 (69.31%) | 19 (21.59%) | 8 (9.09%) |
| 9. | Habits | | | |
| | Nil (n =126) | 95 (75.39%) | 26 (20.63%) | 5 (3.96%) |
| | Smoking (n =53) | 23 (43.39%) | 21 (39.62%) | 9 (16.98%) |
| | Alcohol (n =21) | 2 (9.52%) | 10 (47.61%) | 9 (42.85%) |

**Table 2: Study of biochemical parameters among study population related to osteoporosis.**

| Parameters | Normal (n =120) | Osteopenia (n =57) | Osteoporosis (n =23) | P value |
|---|---|---|---|---|
| **BMI** | 24.14±3.15 | 23.06±3.71 | 20.98±2.88 | 0.00011 |
| **Vitamin D (ng/ml)** | 19.25±4.94 | 13.25±4.87 | 8.01±2.78 | 0.0004 |
| **S. calcium (mg/dl)** | 9.79±0.70 | 9.42±0.65 | 8.85±0.79 | 0.0005 |
| **T score** | 0.61±0.79 | -1.51±0.35 | -2.67±0.25 | 0.0001 |

## DISCUSSION

Male osteoporosis is an under reported public health problem. In our study, we attempted to look at the prevalence of osteoporosis and the various risk factors in healthy men above the age of 40 years attending SMS hospital, Jaipur. In present study, (11.5%) of population had osteoporosis. Vitamin D deficiency was found (71.5%) of the study population. Men who were physically active or having higher body mass index had a better BMD at femoral neck. Prevalence of osteoporosis was more among urban population (14.17%) as compared to rural (6.06%) because of modern life style adopted by urban population.

Prevalence was more among persons practicing sedentary work (24.39%) as compared to moderate (9.09%) or heavy work/exercise (7.04%). Increased mechanical stress leads to more stimulation of osteoblasts and hence more bone mineral density.

Persons belonging to higher socioeconomic strata (APL) have less prevalence of osteoporosis (9.01%) as compared to lower socioeconomic group (BPL) (15.38%). This was due to poor nutritional health and low

education status in persons belonged to low socioeconomic strata.

Prevalence was more in males of less than 60 kg weight (26.66%) as compared with weight more than 60 kg (5.00%). Higher body weight causes increased mechanical stimulation of osteoblasts and hence increase in bone mineral density.

Males with height less than 165 cm have more prevalence (19.14%) as compared with height more than 165 cm (9.15%) because of their good nutritional habits.

Alcoholics have more prevalence (42.85%) as compared to non-alcoholics (3.96%). Alcohol causes direct toxicity of osteoblasts, altering liver profile leading to deranged metabolism of calcium and vitamin-D hence decrease in bone mineral density.

Smokers have more prevalence (16.98%) as compared with non-smokers (3.96%) because nicotine is directly toxic to osteoblast differentiating sialoproteins.

In previously published literature, a 9 percent prevalence of osteoporosis has been reported in Northern India and in oriental men which bears similarity to our study.[9,10]

However, in another study at Rochester, a 19%prevalence of osteoporosis has been reported, the differences in the prevalence that was seen between south Indian and north Indian subjects would have been due to many factors like genetic, nutritional, and other environmental factor which need to be looked at in further prospective studies.[11] The most dreaded complication of osteoporosis is hip fracture, which has been reported to be more in men when compared to women.[12] Osteoporosis in men accounts for more than 30–40% of overall fracture. Fracture in men follows a bimodal presentation with peaks at adolescence and after 60 years.[13] In our study aslo we found deficiency of Vitamin D in more than 50% population. Vitamin D deficiency can either decrease mineralization or cause secondary hyperparathyroidism or both resulting in a low bone mineral density.[14] A low vitamin D may also cause proximal myopathy predisposing these patients to a fall and subsequent fracture.[15]

## CONCLUSION

Osteoporosis is a silent killer and prevention is better than cure as prevention requires simple steps such as good dietary habits, active life style, good control of systemic disorders, reduced intake of tobacco and alcohol. So we should organize mass awareness programs both at hospital level and by involving various channels of mass communications such as newspaper, radio, television and cinema to highlight these facts. This thing can go a long way in the prevention of osteoporosis and many serious complications like fractures (hip and spine) especially in geriatric population.

## REFERENCES

1. Cooper C, Campion G, Melton LJ. Hip fractures in the elderly: a world-wide projection. Osteoporosis Int. 1992;2(6):285–9.
2. Kiebzak GM, Beinart GA, Perser K, Ambrose CG, Siff SJ, Heggeness MH. Under treatment of osteoporosis in men with hip fracture. Arch Intern Med. 2002;162:2217–22.
3. Nguyen TV1, Eisman JA, Kelly PJ, Sambrook PN. Risk factor for osteoporosis fracture in elderly men. Am J Epidemiol. 1996;144:253–63.
4. Hannan MT, Felson DT, Dawson-Hughes B, Tucker KL, Cupples LA, Wilson PW, et al. Risk factors for longitudinal bone loss in elderly men and women: the Framingham osteoporosis study. J Bone Miner Res. 2000;15(4):710-20.
5. Melton LJ 3rd. How many women have osteoporosis. J Bone Miner Res. 1995;10(2):175-7.
6. Rao SS, Budhwar N, Ashfaque A. Osteoporosis in men. Am Family Physician. 2010;82(5):503–8.
7. Vepa SS. Gender equity & human development. Indian J Med Res. 2007;126(4):328–40.
8. Center JR, Nguyen TV, Schneider D, Sambrook PN, Eisman JA. Mortality after all major types of osteoporotic fractures in men and women: an observational study. Lancet. 1999;353:878–82.
9. Agrawal NK, Sharma B. Prevalence of osteoporosis in otherwise healthy Indian males aged 50 years and above. Arch Osteoporosis. 2013;8(1-2):116.
10. Lee YK, Yoon BH, Koo KH. Epidemiology of osteoporosis and osteoporotic fractures in South Korea. Endocrinol Metab (Seoul). 2013;28(2):90–3.
11. Melton LJ 3rd, Atkinson EJ, O'Connor MK, O'Fallon WM, Riggs BL. Bone density and fracture risk in men. J Bone Miner Res. 1998;13(12):1915-23.
12. Center JR, Nguyen TV, Schneider D, Sambrook PN, Eisman JA. Mortality after all major types of osteoporotic fracture in men and women: an observational study. Lancet. 1999;353(9156):878–82.
13. Diamond TH, Thornley SW, Sekel R, Smerdely P. Hip fracture in elderly men: prognostic factors and outcomes. Med J Australia. 1997;167(8):412–5.
14. Paul TV, Thomas N, Seshadri MS, Oommen R, Jose A, Mahendri NV. Prevalence of osteoporosis in ambulatory postmenopausal women from a semi urban region in southern India: relationship to calcium nutrition and vitamin D status. Endocrine Practice. 2008;14(6):665–71.
15. Harinarayan CV, Joshi SR. Vitamin D status in India-its implications and remedial measures. J Association Physicians India. 2009;57:40–8.