

ORIGINAL RESEARCH

Assessment of prevalence of osteoporosis among study subjects

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ABSTRACT

Background: Osteoporosis is a medical condition characterized by weakened bones and an increased risk of fractures. The present study was conducted to assess prevalence of osteoporosis among subjects. **Materials & Methods:** 114 subjects of both genders were selected. Parameters such as weight (kg), height (cm), body mass index (BMI, kg/m²), absolute areal BMD values (g/cm²) and T scores for five bone sites such as the lumbar spine (L1-4), femoral neck and whole femur were recorded. **Results:** Out of 114 subjects, males were 64 and females were 50. Normal BMD in region of right femur neck was seen in 95% and osteoporosis in 5%. In left femur neck in 90% and 10%, in right total femur in 96% and 4%, left total femur in 98% and 2% and lumbar spine in 97% and 3% respectively. The difference was significant (P< 0.05). The mean bone mineral density (BMD) (g/cm²) and T score of right femur neck was 1.1 and -0.8, left femur neck was 0.92 and -0.7, right total femur was 0.95 and -0.5, left total femur was 0.93 and -0.4, and lumbar spine was 0.97 and -0.6 respectively. The difference was significant (P< 0.05). **Conclusion:** Osteoporosis was highly prevalent in study subjects. The bone mineral density was found to be low.

Key words: bone mineral density, femoral neck, osteoporosis

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INTRODUCTION

Osteoporosis is a medical condition characterized by weakened bones and an increased risk of fractures.¹ It occurs when the creation of new bone doesn't keep up with the removal of old bone, leading to bones that are porous and fragile. Osteoporosis is a condition that weakens bones and increases the risk of fracture.² Because it doesn't have any obvious symptoms and is only found after a fracture has occurred, it is known as a "silent epidemic" and can continue untreated for a very long time. As people live longer, osteoporosis has become a serious public health concern. While bone weakening is common, osteoporosis makes bones brittle and weak, making fractures from even small damage more likely.³

Although not all populations are at the same risk, they are all prone to osteoporosis. Studies show that Asian women are more prone than Caucasian women to acquire osteoporosis.⁴ Because of their smaller skeletons, possible genetic differences, and nutritional deficits, Indians are assumed to have lower bone mineral density (BMD).⁵ According to reports, there is a 40% lifetime chance of hip, spine, and wrist

osteoporotic fractures, and one in three women over 45 will likely experience an osteoporotic fracture. Expert groups estimate that 36 million people in India suffer from osteoporosis.⁶ The present study was conducted to assess prevalence of osteoporosis among subjects.

MATERIALS & METHODS

The present study consisted of 114 subjects of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Parameters such as weight (kg), height (cm), body mass index (BMI, kg/m²), smoking, alcohol use, level of activity and dietary preferences were recorded. All subjects underwent radiographs using dual-energy X-ray absorptiometry (DXA) device. For five bone sites, including the lumbar spine (L1-4), femoral neck and whole femur, absolute areal BMD values (g/cm²) and T scores were available. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 114		
Gender	Male	Female
Number	64	50

Table I shows that out of 114 subjects, males were 64 and females were 50.

Table II Prevalence of osteoporosis among subjects

Bone mineral density	Normal BMD	Osteoporosis	P value
Right femur neck	95%	5%	0.03
Left femur neck	90%	10%	0.05
Right total femur	96%	4%	0.02
Left total femur	98%	2%	0.01
Lumbar spine	97%	3%	0.01

Table II, graph I shows that normal BMD in region of right femur neck was seen in 95% and osteoporosis in 5%. In left femur neck in 90% and 10%, in right total femur in 96% and 4%, left total femur in 98% and 2% and lumbar spine in 97% and 3% respectively. The difference was significant ($P < 0.05$).

Graph I Prevalence of osteoporosis among subjects

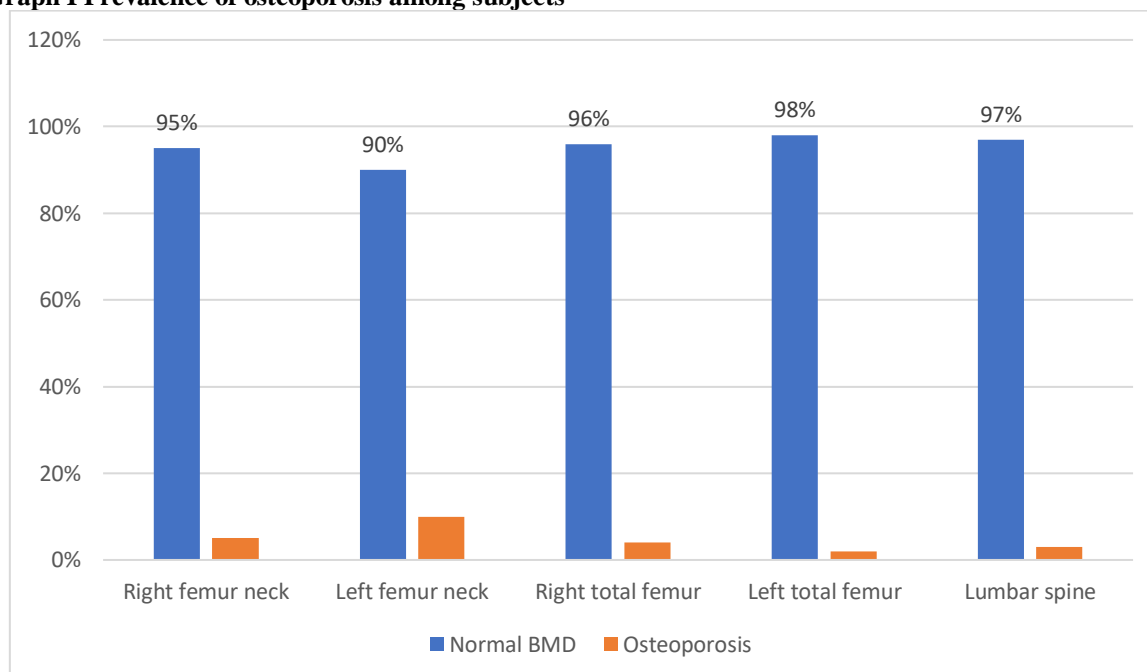


Table III Bone mineral density and T scores of patients

Bone mineral density	Mean	T score
Right femur neck	1.1	-0.8
Left femur neck	0.92	-0.7
Right total femur	0.95	-0.5
Left total femur	0.93	-0.4
Lumbar spine	0.97	-0.6

Table III shows that the mean bone mineral density (BMD) (g/cm^2) and T score of right femur neck was 1.1 and -0.8, left femur neck was 0.92 and -0.7, right total femur was 0.95 and -0.5, left total femur was 0.93 and -0.4, and lumbar spine was 0.97 and -0.6 respectively. The difference was significant ($P < 0.05$).

DISCUSSION

Osteoporosis is characterized by low bone mass, decaying bone tissue, and disturbance of the bone microarchitecture.⁷ Osteoporosis is defined by the World Health Organization (WHO) as a reduction in bone mineral density (BMD) using dual-energy x-ray

absorptiometry (DEXA) that is 2.5 standard deviations or greater below the mean peak BMD of young adults.⁸ There are differences in the risk factors for this condition based on age and sex. Osteoporosis occurs when the rate of bone resorption exceeds the rate of bone formation.⁹ This lowers bone strength and

raises the risk of fracture by causing a loss of bone mass and a disruption in the quality of the bone. The three factors that induce osteoporotic fractures are osteoporosis, falls, and the interface/impact. Interestingly, the highest risk factor for fractures is falling.^{10,11}

We found that out of 114 subjects, males were 64 and females were 50. Agrawal et al¹² evaluated the prevalence of osteoporosis in otherwise healthy Indian males aged 50 years or more and studying the factors affecting bone mineral density (BMD). 200 healthy males aged 50 years or more without the history of fractures or diseases affecting the BMD were evaluated clinically (including anthropometry) and biochemically (serum calcium, phosphate, alkaline phosphatase, creatinine, albumin, 25-OH Vitamin D, intact parathyroid hormone (iPTH), and testosterone). The mean age was 62.61 ± 7.64 years, and BMI was 23.90 ± 3.73 kg/m². The testosterone levels were normal in 84 % subjects. The mean 25-OH vitamin D level was 18.96 ± 10.23 ng/ml; only 13.5 % subjects had normal levels. The mean iPTH level was 72.60 ± 43.77 pg/ml; 57 % subjects had normal iPTH (12-72 pg/ml). The other parameters studied were normal. The osteoporosis and osteopenia were more prevalent when BMD was evaluated at neck of femur (osteoporosis 8.5 vs 8 % at trochanter and 7.5 % at total right hip; osteopenia 42 vs 37 % at trochanter and 41 % at total right hip). The BMD deteriorated with age. The osteoporosis affects 8.5 % of otherwise healthy males aged 50 years and above. Vitamin D deficiency is common in such group and maybe responsible for osteoporosis.

We observed that normal BMD in region of right femur neck was seen in 95% and osteoporosis in 5%. In left femur neck in 90% and 10%, in right total femur in 96% and 4%, left total femur in 98% and 2% and lumbar spine in 97% and 3% respectively. The goal of Kausahal et al.'s¹³ study was to examine the osteoporosis risk factors and bone health status in an otherwise healthy Indian population. They examined 524 patients, 41.2% of whom were female and 58.8% of whom were male (mean age: 50.0 ± 12.4 years). 6.9% of the individuals (females, 11.1%; males, 4.2%) had osteoporosis, and 34% (females, 40.3%; males, 29.9%) had osteopenia. Male subjects had higher absolute bone mineral density (BMD) than female subjects ($P < 0.001$) across all bone locations. In female patients, the prevalence of osteoporosis rose with age, but not in male subjects. In female participants, the rates of osteoporosis at the lumbar region were 3%, 3.4%, 14.3%, 18.6%, 60–69, and ≥ 70 years, whereas in male subjects, the prevalence was 0%, 4%, 6.5%, 4.3%, and 5.6%, respectively. Body mass index ($r = 0.143-0.285$), height ($r = 0.234-0.358$), weight ($r = 0.305-0.388$), and physical activity ($r = 0.136-0.153$) all showed positive correlations with BMD, while alkaline phosphatase ($r = -0.133$ to -0.203) showed negative correlations with BMD at all locations. Even after adjusting for age and

sex, there was still a strong association between these characteristics. There was no significant relationship between BMD and blood 25-hydroxyvitamin D or calcium ($P > 0.05$) at any location.

We found that the mean bone mineral density (BMD) (g/cm²) and T score of right femur neck was 1.1 and -0.8, left femur neck was 0.92 and -0.7, right total femur was 0.95 and -0.5, left total femur was 0.93 and -0.4, and lumbar spine was 0.97 and -0.6 respectively. Karunanayake et al¹⁴ evaluated the prevalence of osteoporosis in both women and men and determined the association between osteoporosis and selected risk factors. Of the 700 subjects who consented to participate in the study, 60% (n = 421) were females. In subjects < 50 years, 9% of women and 3% of men had osteoporosis. In subjects ≥ 50 years, 27% of women and 7% of men had osteoporosis. Female sex (odds ratio [OR] 12.0), smoking (OR 5.5), age > 50 years (OR 3.1), low BMI and low level of education (OR 1.7) were positively associated with osteoporosis. The shortcoming of the study is small sample size.

CONCLUSION

Authors found that osteoporosis was highly prevalent in study subjects. The bone mineral density was found to be low.

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