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Original Research Article

Prevalence of Primary Post Menopausal Osteoporosis at Various Sites in Indian Females

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ABSTRACT

Background: Osteoporosis is characterised by decrease in bone mineral density (mass/volume) of normally mineralized bone which makes it vulnerable to fragility fracture. Post menopausal females are prone to osteoporosis due to deficiency of estrogen following menopause. Due to paucity of litreature regarding bone mineral density distribution at various sites of body in post menopausal osteoporosis, we conducted a cross sectional study to evaluate the bone mineral density and the prevalence of primary postmenopausal osteoporosis at various sites.

Materials & Methods: Total 447 post menopausal females between age group 45-75years were recruited initially in our study. Out of 447 patients, only 225 patients satisfied our inclusion criteria and exclusion criteria were taken in the final study. All patients underwent BMD measurement through DEXA scan. BMD was measured at lumbar Spine, both hips, both femur and left forearm. DEXA scan is interpreted in terms of T score as per World Health Organisation (WHO) guidelines. The analysis was carried out by using SPSS 16.0 version

Results: Total prevalence of osteoporosis was 37.8% and maximum prevalence of osteoporosis was observed at spine (34%) followed by hip (22%) than at forearm (19%) and minimum at the femur.

Conclusion: There is high prevalence of post menopausal osteoporosis among Indian females and females are unaware of it because of its silent presentation, we need to create awareness regarding osteoporosis so that morbidity and mortality related to its can be avoided.

Key Words: Postmenopausal Osteoporosis, Bone mineral density (BMD), Dual Energy X-ray Absorptiometry (DEXA)

INTRODUCTION

Osteoporosis is a systemic skeletal disorder characterized by low bone mass and micro-architectural deterioration of bone tissue, leading to enhanced bone fragility and a consequent increase in fracture risk. [(1)] Osteoporosis results in decrease in bone mineral density (mass/volume) of normally mineralized bone. This reduced bone density affects the mechanical strength makes bone more vulnerable to low impact fracture.

Osteoporosis is classified into two types as Primary osteoporosis and Secondary osteoporosis. Primary

osteoporosis is further divided into two types, Type I is Postmenopausal osteoporosis and Type II is age-related osteoporosis or senile osteoporosis. Secondary osteoporosis as the name suggest is due to various secondary causes like prolong steroid intake, hypercortisolism, hyperthyroidism, hyperparathyroidism, alcohol abuse, and prolong immobilization. [(2)]

Post menopausal osteoporosis defined as "a (silent) skeletal disorder characterised by compromised bone strength predisposing to increased risk of fracture. [(3)] Estrogen is responsible for maintaining bone health in females. Postmenopausal osteoporosis occur in females due to deficiency of oestrogen as a result of menopause. Estrogen deficiency results in increase in osteoclast activity due to decrease in apoptosis rate of osteoclast cell and increase formation of osteoclast cell, ultimately results in increase bone loss in post menopausal females. [(4)] There are only few Indian studies which show the determination of bone mineral density (BMD) through dual energy X-ray absorptiometry (DEXA), moreover at different sites of the body, data is really scarce. We performed a cross sectional study to evaluate the bone mineral density and the prevalence of primary postmenopausal osteoporosis at various sites.

MATERIALS & METHODS

This study was conducted in the department of orthopaedic surgery and department of obstetrics and gynaecology. Informed consent was taken from each subject participating in this study and ethical clearance for the study was obtained from the Ethics Committee of the University. Total 447 females between age group 45-75years were recruited. Females having natural menopause at least one year after the onset of menopause were enrolled. Patient suffering from chronic diseases like hepato-renal disorder, thyroidism, hyperparathyroidism, rheumatoid arthritis, malignancy were excluded from our study. Patients with a history of steroid intake or any other medication affecting bone turnover metabolism were also excluded. Out of 447 patients, only 225 patients, satisfying our inclusion criteria were included in the final study. All patients underwent BMD measurement through DEXA scan. BMD was measured at lumbar Spine, both hips, both femur and left forearm. DEXA scan is interpreted in terms of T score as per World Health Organisation (WHO) guidelines. [(5)]

Normal bone	T-score greater than -1
Osteopenia	T-score between -1 and -2.5
Osteoporosis	T-score less than -2.5

After BMD measurement, all patients were offered to fill a questionnaire pertaining their demographic variables, menstrual history, physical activity, exercise history and dietary intake.

Analysis

The results are presented in mean±SD and percentages. The unpaired t-test was used to compare the mean BMD between with osteoporosis and without osteoporosis. The p-value<0.05 was considered significant. The analysis was carried out by using SPSS 16.0 version (Chicago, Inc., USA).

RESULTS

Total 225 females with mean age 54.5 years underwent BMD testing with DEXA scan. Out of 225 subjects 84 were found to be osteoporotic (Table-1) . Mean bone mineral density in 85 patients with osteoporosis at spine was 0.82±0.12,at left hip 0.70±0.10,at right hip0.72±0.11,at left femur 0.80±0.12,at right femur0.81±0.11 and at left forearm 0.63±0.12 and on

comparing with non-osteoporotic patients(n=140) ,it was found to be significant at all sites (p value<.05)(Table-2).

Table-1: Total Prevalence of osteoporosis

Osteoporosis	No. (n=225)	%
With Osteoporosis	85	37.8
Without Osteoporosis	140	62.2

Table-2: Comparison of BMD

BMD	With Osteoporosis (Mean±SD)	Without Osteoporosis (Mean±SD)	p-value[1]
AP spine	0.82±0.12	1.09±0.13	0.0001*
Neck left	0.70±0.10	0.90±0.11	0.0001*
Neck right	0.72±0.11	0.92±0.11	0.0001*
Femur left	0.80±0.12	1.03±0.13	0.0001*
Femur right	0.81±0.11	1.04±0.13	0.0001*
Forearm left	0.63±0.12	0.82±0.07	0.0001*

[1]Unpaired t-test

Mean T score in 85 patients with osteoporosis at spine was -2.95±1.07,at left hip -2.37±0.74,at right hip -2.23±0.77,at left femur-1.87±2.71,at right femur -1.58±0.91 and at left forearm-2.83±1.42 and on comparing with non-osteoporotic patients(n=140) ,it was found to be significant at all sites (p value<.05)(Table-3)

Table-3 Comparison of T-scores

T-score	With Osteoporosis (Mean±SD)	Without Osteoporosis (Mean±SD)	p-value[1]
AP spine	-2.95±1.07	-0.65±1.08	0.0001*
Neck left	-2.37±0.74	-0.95±0.72	0.0001*
Neck right	-2.23±0.77	-0.81±0.82	0.0001*
Femur left	-1.87±2.71	0.20±1.02	0.0001*
Femur right	-1.58±0.91	0.30±1.07	0.0001*
Forearm left	-2.83±1.42	-0.76±0.83	0.0001*

[1]Unpaired t-test

Prevalence of osteoporosis at spine was 33.8%,at left hip 21.3%,at right hip 22.7%,at left femur 15.1%,at right femur 15.1% and at left forearm 19.6%(Table-4).Overall prevalence of osteoporosis was 37.8%,when diagnosis of osteoporosis was made by considering any site in all the subjects.

Table-4 Prevalence of osteoporosis at various sites

Sites	Normal		Osteopenia		Osteoporosis	
	No.	%	No.	%	No.	%
Spine	87	38.7	62	27.6	76	33.8
Neck Left	85	37.8	92	40.9	48	21.3
Neck Right	81	36.0	93	41.3	51	22.7
Femur Left	148	65.8	43	19.1	34	15.1
Femur Right	149	66.2	42	18.7	34	15.1
Forearm left	101	44.9	80	35.6	44	19.6

DISCUSSION

Osteoporosis is a preventable disease, if diagnosed earlier than its catastrophic consequences can be avoided by taking adequate treatment. We carried out this cross-sectional study in cohort of post-menopausal females who do not have any prior symptoms related to bone-turn over metabolism. We found maximum prevalence of osteoporosis at spine followed by hip than at forearm and minimum at the femur. We observed detection of osteoporosis at spine is more sensitive than other sites, a similar observation was also

made by Acharya et al [6] in his study, but he showed 18 % total prevalence of osteoporosis which was lower than our observation. However, Paul et al [7] reported high prevalence of osteoporosis in his study on post menopausal women,he reported that the prevalence of osteoporosis was 48% at the lumbar spine and 17% at the femoral neck and 50% at any site in Indian postmenopausal women using DEXA scan. Dongoonkar et al [8] in his study on 55 post menopausal females found that the prevalence of osteoporosis was 50% at the spine and 30% at the hip and overall prevalence was 60% using DEXA scan. Gopinath et al [9] observed 44.82% total prevalence of osteoporosis in post menopausal female with natural menopause.

All patients with osteoporosis should be treated with biphosphonates , nutritional supplementation with calcium, Vitamin D and exercises. [10] Biphosphonates are the main pharmacological agent use for treatment of osteoporosis. In our study, we treated most of our patients with weekly alendronate along with daily calcium, vitamin D supplementation and weight bearing exercises.

CONCLUSION

Osteoporosis is a major health problem and it requires greater attention because of its silent presentation and high prevalence, as we observed that in our cohort of post menopausal females, more than one third females are suffering from osteoporosis, it will be much more if we would have included females having secondary osteoporosis. So the need is to create awareness, campaigns regarding osteoporosis in the general population in order to reduce morbidity and mortality associated with osteoporosis.

Conflict Of Interest: None

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