

# Role Of Bone Mineral Density To Asses Osteoporosis At Tertiary Centre In Men.

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## ABSTRACT

**Background:** Osteoporosis is highly prevalent, with an estimated 30 million women diagnosed to have osteoporosis. A bone mineral density (BMD) test measures how much calcium and other types of minerals are present in a section of bone. The absolute amount of bone as measured by bone mineral density (BMD) testing generally correlates with bone strength and its ability to bear weight. Osteoporosis is a progressive bone disease that is characterized by a decrease in bone mass and density and that leads to an increased risk of fractures. Osteoporosis is defined by the World Health Organization (WHO) as a bone mineral density that lies 2.5 standard deviations or more below the a T-score of <-2.5SD.(average of young, healthy adults) as measured by dual-energy X-ray absorptiometry. Quantitative ultrasound (QUS) of bone is a technique for assessing bone microarchitecture in addition to bone mass. QUS has many advantages compared with traditional densitometry, including lack of radiation, cost and potential portability. **Methods:** Retrospective study was done in 1220 male patients in department of orthopedics, Patna medical college and hospital, Patna presenting with back pain, history of fracture after minor trauma, alcoholics, patient on drugs like steroids and chronic smokers. The study does not include the patients having fractures due to road traffic accidents or pathological fractures associated with primary or secondary bone tumors. The BMD estimation of these patients was done by quantitative ultrasonography of the calcaneal bone and the analysis done on the basis of T –scores.. **Results:** 1220 patients were included in the study from department of orthopedics, Patna medical college and hospital, Patna. Patients were in the age group of 25-75 yrs. Among these 30% (n=366) were between 25-40yrs, 45% (n=550) between 41-60yrs and 25% (n=304) between 61-75 yrs. Commonest presenting symptom in the study population was Backache which was 60% (n=732). 30% (366) presented with generalized bone pain and 10% (122) patients had a history of fracture after trivial trauma. Of the 1220 patients included in the study 45% (n=550) were osteoporotic, 29% (n=354) were osteopenia and severe osteoporosis 10%. Majority of the osteoporotic patients fell in the age group of 41-60 yrs. **Conclusion:** Our study shows that the osteoporosis and osteopenia is more common in males in the age group of 40-60 yrs. Early detection and prompt treatment is required to prevent pathological fractures. Quantitative ultrasonography is one of the most effective tools for early detection of osteopenia and osteoporosis as this is cost effective, lacks radiation exposure and yields good results, comparable to other diagnostic tools like DEXA scan.

**Keywords:** Bone Mineral Density, Osteoporosis.

## INTRODUCTION

Bone is connective tissue that is composed of approximately 25% water, 30% organic fibrous tissue, and 45% inorganic salts. Osteoporosis is a progressive bone disease that is characterized by a decrease in bone mass and density and that leads to an increased risk of fractures. Osteoporosis is defined by the World Health Organization (WHO) as a bone mineral density that lies 2.5 standard

deviations or more below the a T-score of <-2.5SD.(average of young, healthy adults) as measured by dual-energy X-ray absorptiometry; Osteoporosis is characterized by a reduction in bone density, associated with skeletal fragility and an increased risk of fracture after minimal trauma The disease may be classified as primary type 1, primary type 2, or secondary.<sup>[1]</sup>

The form of osteoporosis most common in women after menopause is referred to as primary type 1 or postmenopausal osteoporosis. Primary type 2 osteoporosis or senile osteoporosis occurs after age 75 and is seen in both females and males in a ratio of 2:1. Secondary osteoporosis may arise at any age and affect men and women equally. The major secondary causes of osteoporosis in men with

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vertebral fractures are hypogonadism, smoking, anti-convulsant therapy, oral steroid therapy and alcohol abuse. Until recently, the diagnosis of osteoporosis in men was based on the development of fractures after minimal trauma.

The introduction of dual energy X-ray absorptiometry for the measurement of bone density has stimulated interest in the diagnosis of osteoporosis before fractures occur.<sup>[2]</sup> A bone mineral density (BMD) test measures how much calcium and other types of minerals are present in a section of bone.<sup>[3,4]</sup>

Quantitative ultrasound (QUS) of bone is a technique for assessing bone microarchitecture in addition to bone mass. From birth to age 25 or 30, the body builds more new bone than it breaks down. By age 30, bones become the strongest they will ever be. This phase of bone development is called peak bone mass. The level of bone mass achieved at the peak is determined largely by genetics, but also by nutrition, exercise and menstrual function.<sup>[5,6]</sup>

After about age 30, our body breaks down old bone faster than it builds new bone. This process speeds up dramatically as menopause approaches and for several years after. In the first five to seven years following menopause, bone lose up to 20 percent of bone mass.<sup>[7]</sup> In contrast to postmenopausal bone loss, which is associated with excessive osteoclast activity, the bone loss that accompanies aging is associated with a progressive decline in the supply of osteoblasts in proportion to the demand. This demand is ultimately determined by the frequency with which new multicellular units are created and new cycles of remodeling are initiated.<sup>[8,9]</sup> Hence, we planned this study to evaluate bone mineral density (BMD) in women above 45 years of age in North-West Rajasthan.

QUS has many advantages compared with traditional densitometry, including lack of radiation, cost and potential portability. For assessing osteoporosis usually calcaneal measurements are taken.<sup>[10]</sup> It takes less than a minute and is more cost effective than DEXA scan. It has advantage of portability, easy accessibility, lack of ionizing radiations and is relatively inexpensive. Its disadvantages are that it cannot measure bone mass density at axial sites, with significant rate of false negatives and high degree of variability.

## MATERIALS AND METHODS

Retrospective study was conducted in the Department of Orthopaedics, department of orthopedics, Patna medical college and hospital, Patna over 1220 patient. An informed consent was obtained from all control and cases. For assessing Bone mineral density, calcaneal measurement was done in 1220 patients. Inclusion criteria include all

male patients presenting to OPD with complaints of back ache, fracture after trivial trauma and steroid induced osteoporosis. Exclusion criteria include patients on anticancer chemotherapy and pathological fractures associated with primary or secondary bone tumors. Bone mineral density was estimated with quantitative ultrasonography and expressed as T-score. The patients after assessment of BMD were classified according to WHO criteria [Table 1].

**Table 1:**

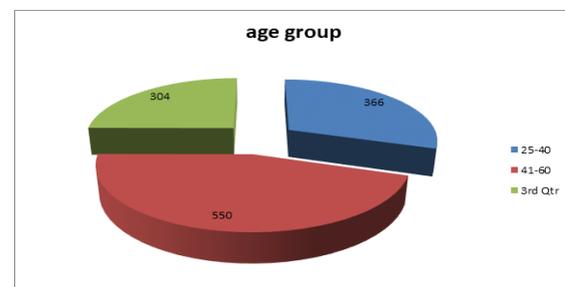
Diagnostic classification	T- Score
Normal	>-1.0
Osteopenia	-1.0 to -2.5
osteoporosis	< -2.5
Severe osteoporosis	< -2.5 with fracture

## RESULTS

1220 patients were included in the study. Patients were in the age group of 25-75 yrs. Among these 30% (n=366) were between 25-40yrs, 45% (n=550) between 41-60yrs and 25% (n=304) between 61-75 yrs. [Table 2 & Figure 2].

**Table 2: patient's distribution according to age group.**

Age Group (YRS)	Number of patients(n)	Percentage (%)
25-40	366	30%
41-60	550	45%
61-75	304	25%



**Figure 2: patient's distribution according to age group.**

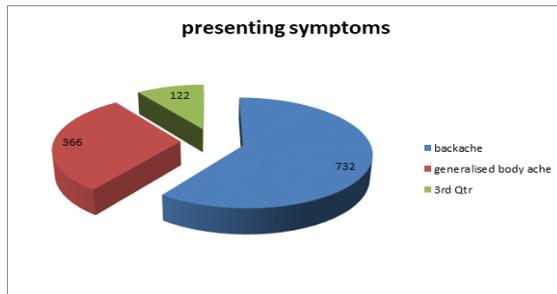
**Table 3: patient distribution according to presenting symptoms.**

Symptom	Number of patients(n)	Percentage
Backache	732	60%
Generalized bone pain	366	30%
History of fracture with trivial trauma	122	10%

Commonest presenting symptom in the study population was Backache which was 60% (n=732). 30% (366) presented with generalized bone pain and 10% (122) patients had a history of fracture after trivial trauma [Table 3 & Figure 3].

Of the 1220 patients included in the study 45% (n=550) were osteoporotic, 29% (n=354) were

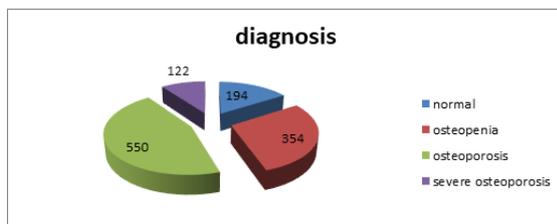
osteopenia and severe osteoporosis 10% (122) [Table 4 & Figure 4].



**Figure 3: patient distribution according to presenting symptoms**

**Table 4: Patient distribution according diagnosis.**

Diagnosis	Number of patient(n)	Percentage (%)
Normal	194	16%
Osteopenia	354	29%
Osteoporosis	550	45%
Severe osteoporosis	122	10%



**Figure 4: patient distribution according diagnosis.**

Majority of the osteoporotic patients fell in the age group of 41-60 yrs.

## DISCUSSION

Osteoporosis affects over 20 million Americans and leads to approximately 1.5 million fractures each year, making it one of the leading public health problems in the United States.<sup>[11]</sup>

In our present study bone mass density in 1220 patients was estimated. Range of bone mass was measured by bone mineral density assessment through calcaneal bone. It was observed that 45% Patients had osteoporosis and 29% patients had osteopenia as detected by quantitative ultrasonography. Majority of the osteoporotic and osteopenic patients fell in the age group of 41-60 yrs .Our study is comparable to study conducted by J-D LIN, et al.<sup>[12]</sup> They showed that peak incidence of osteopenia was 41.25% in the 51-60-year old age group. In Gandhi AB et al study they observed that 34 percent of the patients in their study were affected by osteopenia.<sup>[13]</sup>

The influence of obesity on BMD is believed to be mediated by mechanical loading of BMI on bone formation. Nonetheless, lean body mass has been considered as an independent predictor of femoral neck and lumbar spine BMD, whereas the fat

component of obesity did not exert any protective effect on bone mass. The percentage of normal BMD measurements decreased rapidly from 21-30year old age group to the 71-80 year old age group. Published studies show that low body weight (less than 58 kg) is associated with an increased risk of osteoporosis and fractures.<sup>[14-18]</sup>

JPS WALIA, A SINGH .et al 19 in their study show that in osteoporotic patients with age 45 years or over there was age related decline in T- Scores. This was higher in women compared to men. They conclude that all patients with fractures due to osteoporosis had poor bone quality. Thus quantitative ultrasound densitometry may be mandatory for a person with osteoporotic fractures.

From this study we recommend that quantitative ultrasonography is a good alternative tool to DEXA scan for screening and diagnosis of osteoporosis .The advantages over DEXA scan are that this is cost effective, there is no radiation exposure, and it is a simple procedure and portable.

## CONCLUSION

Our study shows that the osteoporosis and osteopenia is more common in males in the age group of 40-60 yrs. Early detection and prompt treatment is required to prevent pathological fractures. Quantitative ultrasonography is one of the most effective tools for early detection of osteopenia and osteoporosis as this is cost effective, lacks radiation exposure and yields good results, comparable to other diagnostic tools like DEXA scan. Hence From the above results, we conclude that significant correlation exists while comparing the age group of the patients with the diagnosis for BMD. However, future studies are recommended.

## REFERENCES

1. Faulkner KG, McClung MR, Coleman LJ, Kingston-Sandahl E. Quantitative ultrasound of the heel: correlation with densitometric measurements at different skeletal sites. *OsteoporosInt*1994; 4:42-7.
2. Glu" er CC, Cummings SR, Bauer DC, Stone K, Pressman A, Mathur A, et al. Osteoporosis: association of recent fractures with quantitative US findings. *Radiology* 1996; 199:725-32
3. WHO Study Group. Assessment of fracture risk and its application to screening for Postmenopausal osteoporosis. WHO Technical Report Series, World Health Organization, 1994; Geneva.
4. Genant HK, Engelke K, Fuerst T, Gluer CC, Grampp S, Harris ST, Jergas M, Lang T, Lu Y, Majumdar S, Mathur A, Takada M. Noninvasive assessment of bone mineral and structure: State of the art. *J Bone Miner Res.* 1996; 11:707-730.
5. Kanis JA, McCloskey EV, D de Takats, Pande K. Clinical assessment of Bone Mass, Quality and Architecture. *Osteoporos Int.* 1999; Suppl.2:S24-S28.
6. Pande KC. Prevalence of low bone mass in healthy Indian population. *J Ind Med Assoc.* 2002; 1000:598-600.

7. Genant HK. Radiology of Osteoporosis and other Metabolic Bone Diseases. In Favus MJ, editor. Osteoporosis and Metabolic Bone Diseases. Philadelphia: Lippincot-Raven, Publishers, 1996; 152-163.
8. Unni J, Garg R, Pawar R. Bone mineral density in women above 40 years. J Mid-life Health. 2010; 1:19-22.
9. Acharya S, Fuchs SC, Donato G, Bastos CA, Spritzer PM. Physical, psychological, and menopause-related symptoms and minor psychiatric disorders in a community-based sample of Brazilian premenopausal, perimenopausal, and postmenopausal women. Menopause. 2000; 19:355-60.
10. Low SL, Goh JCH, DasDe S et al. Calcaneal ultrasound in males and females: Normative data and relationship to DXA. Osteoporos Int 2000; 2: S-57-209
11. Lee JS, Scholes D, Brunner RL, Robbins J, Reed SD, Newton KM et al. Depressive symptoms, bone loss, and fractures in postmenopausal women. J Gen Intern Med. 2001; 23:567-74.
12. J-D LIN, MD, J-F CHEN, MD, H-Y CHANG, MD and C HO, MD -Evaluation of bone mineral density by quantitative ultrasound of bone in 16 862 subjects during routine health examination -The British Journal of Radiology, 74 (2001), 602-606 E 2001
13. Gandhi A, Shukla A. Evaluation of BMD of women above 40 years of age. J Obstet Gynaecol India 2005; 55:265-7.
14. Schneider M, Weller A, Vaisman N, Kreitler S. The relationship of depression, anxiety and stress with low bone mineral density in post-menopausal women. Arch Osteoporos. 2002; 7:247-55.
15. Iketani T, Kiriike N, Nakanishi S, Nakasuji T. Effects of weight gain and resumption of menses on reduced bone density in patients with anorexia nervosa. Biol Psychiatry. 1995 Apr 15; 37(8):521-7.
16. Pearce G, Bradney M, Hendrich E, Delmas P.D, Harding A, Seeman E, et al. (1996) Exercise before puberty may confer residual benefits in bone density in adulthood: studies in active prepubertal and retired gymnasts. Journal of Bone Mineral Research 13, 500-507.
17. Michelson D, Stratakis C, Hill L, Reynolds J, Galliven E, Chrousos G, Gold P. Bone mineral density in women with depression. N Engl J Med. 1996 Oct 17; 335(16):1176-81.
18. Duan Y, Turner CH, Kim BT, Seeman E. Sexual dimorphism in vertebral fragility is more the result of gender differences in age-related bone gain than bone loss. J Bone Miner Res. 1997; 16:2267-2275.
19. JPS WALIA, A SINGH, AC GUPTA, B SINGH, AK WALIA, D KUMAR -Assessment Of Quantitative Ultrasound Densitometry In 100 Persons With Fractures Due To Osteoporosis-Ind J Radiol Imag 2006 16:4:597-601

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