ORIGINAL RESEARCH

Role of bone mineral density to assess osteoporosis at tertiary centre

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ABSTRACT
Background: Measuring the density of the bone plays a vital role in the analysis of the human bone health. The present study was conducted to assess role of bone mineral density in assessment of osteoporosis.
Materials & Methods: 75 patients age ranged 30-60 years of both genders were included. The BMD estimation of these patients was done by quantitative ultrsonography of the calcaneal bone and the analysis done on the basis of T –scores. R
Results: Age group 30-40 years had 26, 40-50 years had 30 and 50-60 years had 19 patients. clinical presentation was backache in 35%, bone pain in 48% and fracture in 17%. osteopenia was seen in 45 and osteoporosis in 30 patients.
Conclusion: osteoporosis was seen in maximum subjects. Hence there is need to look after bone calcium and phosphate level especially in age subjects.
Key words: Fracture, osteoporosis, Osteopenia

INTRODUCTION
Measuring the density of the bone plays a vital role in the analysis of the human bone health. This is a very important feature in the field of medical image processing. The diagnosis and effective treatment directly lies in the statistical analysis and models of the bone structure.[1]
Osteoporosis has been operationally defined on the basis of bone mineral density (BMD) assessment.[2] According to the WHO criteria, osteoporosis is defined as a BMD that lies 2.5 standard deviations or more below the average value for young healthy women (a T-score of <-2.5 SD). There are many scanning methods available to measure BMD and detect osteoporosis condition.[3] Among those methods, DEXA is the recent method used in the medical field for the analysis of BMD. The starting point of the DEXA scan has big olden times. This criterion has been widely accepted and, in many Member States, provides both a diagnostic and intervention threshold. The most widely validated technique to measure BMD is dual energy X-ray absorptiometry (DXA), and diagnostic criteria based on the T-score for BMD are a recommended entry criterion for the development of pharmaceutical interventions in osteoporosis.[4]
In the past decade, a great deal of research has taken place to identify factors other than BMD that contribute to fracture risk. Examples include age, sex, the degree of bone turnover, a prior fracture, a family history of fracture, and lifestyle risk factors such as physical inactivity and smoking. Some of these risk factors are partially or wholly independent of BMD.

Independent risk factors used with BMD could, therefore, enhance the information provided by BMD alone.[5] The present study was conducted to assess role of bone mineral density in assessment of osteoporosis.

MATERIALS & METHODS

The present study comprised of 75 patients age ranged 30-60 years of both genders. Patients presenting with back pain, history of fracture after minor trauma, alcoholics, patient on drugs like steroids and chronic smokers were enrolled. All were enrolled with the written consent. Ethical clearance was obtained before starting the study.

Data such as name, age, gender etc. was recorded. The BMD estimation of these patients was done by quantitative ultrsonography of the calcaneal bone and the analysis done on the basis of T –scores. Results thus obtained were subjected to statistical inference using Mann Whitney U test. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Age group (years)	Number	P value
30-40	26	0.72
40-50	30	
50-60	19	

Table I shows that age group 30-40 years had 26, 40-50 years had 30 and 50-60 years had 19 patients. The difference was non- significant (P> 0.05).
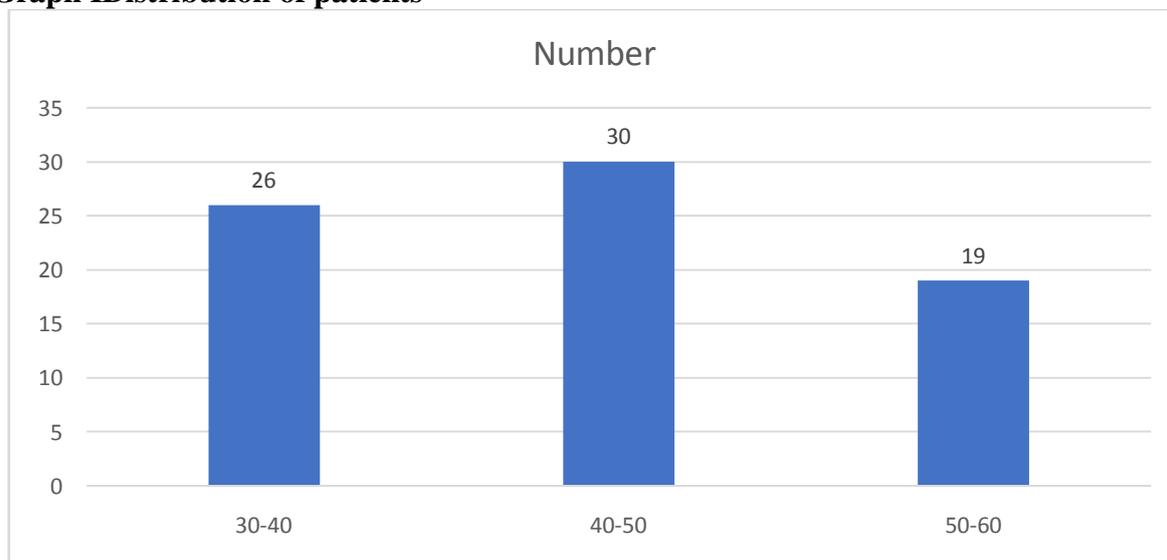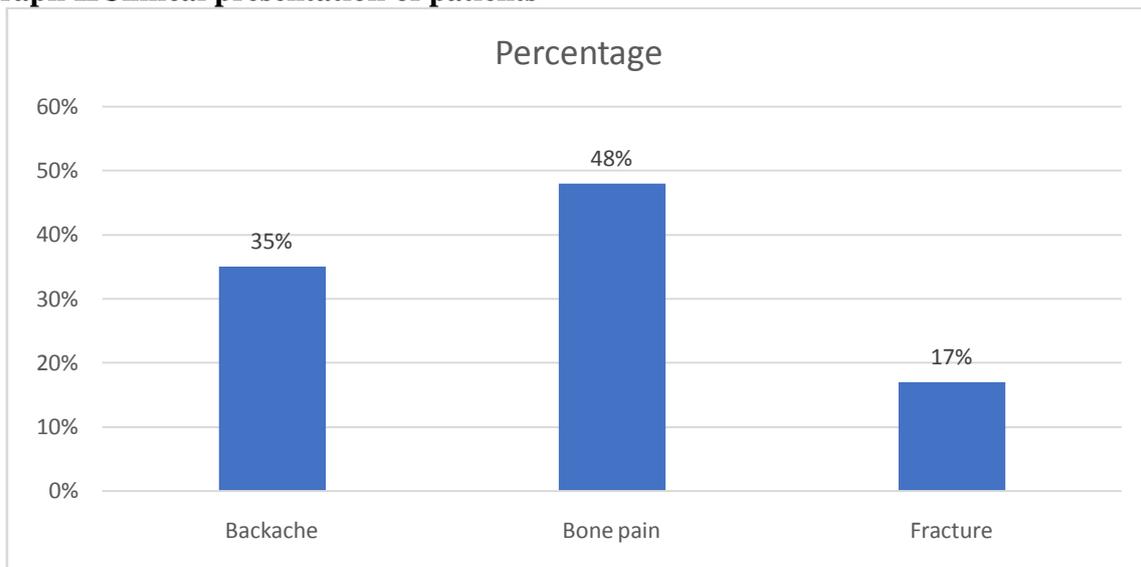
Graph IDistribution of patients

Table II Clinical presentation of patients

Clinical presentation	Percentage	P value
Backache	35%	0.05
Bone pain	48%	
Fracture	17%	

Table II, graph II shows that clinical presentation was backache in 35%, bone pain in 48% and fracture in 17%. The difference was significant (P< 0.05).

Graph IIClinical presentation of patients

Table III BMD of patients

BMD (T value)	Number	P value
Osteopenia (-1 and -2.5 SD)	45	0.05
Osteoporosis (<-2.5 SD)	30	

Table III shows that osteopenia was seen in 45 and osteoporosis in 30 patients. The difference was significant (P< 0.05).

DISCUSSION

Screening for osteoporosis, primarily with bone mineral density (BMD) testing, permits prediction of future fractures among white women. However, screening may not be adequately performed on at-risk patients. As the population ages and osteoporosis increases in prevalence, there is a growing need to develop practical public health initiatives to bring effective screening technologies and strategies to widespread use.[6] This is particularly important in light of the substantial morbidity, mortality, and medical costs caused by osteoporosis. One of the research priorities described by the 2000 NIH Consensus Development Conference on Osteoporosis was the "need to study the most effective method of educating the public and health care professionals about the diagnosis and treatment of osteoporosis."[7] To realize this priority, the scope of the problem must be adequately assessed, obstacles to providing screening must be identified, and prior interventions to improve screening must be examined.[8]In 1980s, the most expensive and superior radioactive sources have been outdated by Single X-ray Absorptiometry (SXA) and Dual Energy X-ray Absorptiometry. DEXA is dependent on the Age factor (i.e.) to estimate the BMD of the bone and also we need to know the T-Score, Z-Score and the age of the patient to detect whether the patient is suffering from Osteoporosis or Osteopenia or Normal.[10] The present study was conducted to assess role of bone mineral density in assessment of osteoporosis.

In present study, age group 30-40 years had 26, 40-50 years had 30 and 50-60 years had 19 patients. Singh et al[11]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 toroad traffic accidents or pathological fractures associated with primary or secondary bone tumors. The

BMD estimation of these patients was done by quantitative ultrsonography of the calcaneal bone and the analysis done on the basis of T –scores.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 was60% (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.

We found that clinical presentation was backache in 35%, bone pain in 48% and fracture in 17%. Chawla et al[12] found that average age of the study population was 46.54 years and BMI 26.58. The prevalence of osteopenia in the study was 36%, and that of osteoporosis, 4%; the overall prevalence of low BMD being 40%. Proportion of women with low BMD increased with advancing age and menopausal status. On endocrine evaluation, 53.44% cases with insufficient vitamin D, 62.5% with hyperparathyroidism, 100% with hypothyroidism, 75% with hyperthyroidism suffered from low BMD. Among chronic diseases, 75% women with diabetes, 33.3% with hypertension, 25% with deranged liver function and 50% with rheumatoid arthritis were found to have low BMD. 46.75% women with sun exposure less than one hour daily had poor bone mineralization. The proportion of women with normal BMD decreased from 84.09% to 43.33% with decrease in daily physical work. On logistic regression analysis, insufficient serum vitamin D concentrations, less physical work and inadequate sun exposure were found to be significantly associated with low BMD.

We observed that osteopenia was seen in 45 and osteoporosis in 30 patients. Morris et al[13] a total of 235 articles were identified, and 51 met criteria for review: 24 practice guidelines, 22 studies of screening patterns, and 5 interventions designed to increase BMD rates. Of the practice guidelines, almost one half (47%) lacked a formal description of how they were developed, and recommendations for populations to screen varied widely. Screening frequencies among at-risk patients were low, ranging from 1% to 47%. Only eight studies assessed factors associated with BMD testing. Female patient gender, glucocorticoid dose, and rheumatologist care were positively associated with BMD testing; female physicians, rheumatologists, and physicians caring for more postmenopausal patients were more likely to test patients. Five articles described interventions to increase BMD testing rates, but only two tested for statistical significance and no firm conclusions can be drawn.

CONCLUSION
Authors found that osteoporosis was seen in maximum subjects. Hence there is need to look after bone calcium and phosphate level especially in age subjects.

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