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PREVALENCE OF OSTEOPENIA AND OSTEOPOROSIS IN PEOPLE OF DIYALA PROVINCE BY USING QUANTITATIVE ULTRASOUND DEVICE OF OSTEOPRO TYPE

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ABSTRACT
Purpose: The aim of study was to assess the prevalence of osteoporosis and changes in bone mass with increasing age and compare bone health status of apparently healthy men, premenopausal and postmenopausal women in diyala province. **Methods:** Data were collected according to questioners in 773 apparently healthy Iraqi adults (women = 736 men=37), 20->80 years of age, in a cross-sectional study in baquba city, Iraq. Bone mineral density (BMD) was measured by quantitative ultra sound device named osteo PRO at calcaneal bone. Individuals were classified as having osteoporosis or osteopenia based on the World Health Organization criteria of T-scores. Results the result showed that 80.466% had alteration in BMD while 95. 213% are female and 4. 787% are male gender osteoporosis was significant at age 51-60 [42. 456%] while osteopenia was significant at age 61-70 [29.970%]. Conclusion the osteoporosis was significant at 51-60 years age group while osteopenia was significant at 61-70 years, 97.193 % female are osteoporotic and 91 .395% are osteopenia a low T-score compared to age, gender indicates higher susceptibility to osteoporosis. In women, menopause causes a rapid decline in BMD. Therefore, both Iraqi men and postmenopausal women require adequate measures to prevent osteoporosis during later years in life.

INTRODUCTION
Osteoporosis is defined as a progressive, systemic, skeletal disease characterized by low bone mass and micro architectural deterioration of bone tissues with a consequent increase in bone fragility and susceptibility to fracture.[1] Studies have shown that bone loss starts from the age of 30–40 years in both men and women. In women, it has been postulated that menopause is followed by an immediate decrease in bone mass and density within a year. This increased rate of bone loss reaches equilibrium approximately 10 years after menopause and then merges into a continuous age-related loss.[2] While type 1 or postmenopausal osteoporosis generally occurs before the age of 65 years and affects women, Type 2 osteoporosis is universal after peak bone mass has been attained and is found in both men and women.[2] While women experience marked increase in bone loss during perimenopause and post menopause, in men, a small longitudinal bone loss is observed throughout life.[3],[4] Thus, women in addition to age-related bone loss also experience menopausal bone loss. Although it is said that bone loss in a universal phenomenon that starts from the time peak bone mass is achieved, most studies have assessed bone health status in postmenopausal women and men above 50 years of age. Further, studies on the effect of increasing age on bone health status are few. Therefore, studies in apparently healthy men and women are required.

Worldwide, it is estimated that 1 in 3 women above the age of 50 will experience osteoporotic fractures, as well as 1 in 5 men.[5] India with a population of 1.2 billion people is the second most populated country in the world with approximately 10% of population (more than 100 million) over 50 years of age.[6] In 2013, sources estimate that 50 million people in India are either osteoporotic (T-score lower than-2.5) or have low bone mass (T-score between-1.0 and-2.5).[7] Studies indicate that osteoporosis and osteopenia or low bone mass may occur at a relatively younger age in Indian population.[8],[9] Despite being a common cause of morbidity and mortality in males, Indian data on male osteoporosis are few. A study in Delhi estimated the prevalence of osteoporosis as 24.6% in men and 42.5% in women above 50 years of age.[10] Another study by Sharma et al. has reported a prevalence of 8.5% in the femoral neck region in men.[11] Even though these estimates suggest that prevalence of osteoporosis in males is lower than in women, mortality in males post hip fracture is high.[12] Further, in older men, the risk of hip fracture or vertebral fracture is 30% higher than in women of the same age.[12] Male osteoporosis largely remains underdiagnosed and untreated and is revealed only after the occurrence of a

fracture. Osteoporotic fractures in men are more common than myocardial infarction and prostate cancer, and yet the majority of studies in osteoporosis have a focus on women especially postmenopausal women with little data available in men.[13]

The use of quantitative ultrasound (QUS) for the measurement of bone was first reported by Langton et al. in 1984. Since 1984, the use of QUS has expanded vastly, and it has been widely used for research and clinical purposes.[14] The first ultrasound system reported by Langton used transmission mode ultrasound with a transmitting and a receiving transducer placed either side of the calcaneus, which was placed within a water bath[14] The calcaneus was chosen as a site for measurement since it is easily accessible, with the medial and lateral aspects being relatively flat and parallel. It contains approximately 90% trabecular bone, which has a high metabolic turnover rate and a pattern of bone loss similar to the spine.[15][16] The majority of subsequent ultrasound systems have been based upon this prototype, although dry systems which use ultrasound gel as a coupling medium instead of water have also been introduced. Much of the research done into QUS has therefore been performed using ultrasound measurements of the calcaneus. However, there have also been devices introduced that measure the patella, tibia, phalanges, radius and metatarsal, using a range of techniques including transmission and semi-reflection or axial transmission mode ultrasound.[17]

Therefore, the aim of the present study was to assess the prevalence of osteoporosis and osteopenia in dial province and to study the two conditions with other variables like age and gender.

Methods the cross sectional study was conducted in rheumatology private clinic at baquba city, diyala province, Iraq over period from fist January to 31 of December 2017, 773 patient who come to clinic were selected for the study, patient were selected by simple random sampling, all patient are from Iraq residing in diyala province and have completed 20 years of age, patient without risk factors like chronic renal diseases, hyperthyroidism, hyper parathyroidism, hypogonadism and malabsorption and those on medication such as anticonvulsant and ant tuberculosis were selected for study, an informed consent was taken from all patients and questionnaire was given relating to age and gender, patient were sent to quantitative ultra sound[QUS] device named OSTEOpro to undergo bone mineral density testing [BMD], BMD was measured at calcaneal bone either left or right side QUS report was given by assistant, the report was based on WHO classification ranges of BMD T score to classify patient into three groups either normal, osteopenia or osteoporotic patients[table1], the data was analyzed to find correlation between age and gender with different BMD

WHO classification Table1.

Normal	o-1
Osteopenia	-1 to -2.5
Osteoporosis	.>2.5

RESULT

Among 773 patients 337 patients are osteopenia [43.596%] and 285[36.869%] are osteoporotic and 151 [19.534%] are normal or total of 622 [80.466%]had abnormal BMD test by QUS table2, A total of 736[95.213%] patients are female and 37 [4.787] patient are male gender table3, when analysis of data was carried out according to gender association with osteopenia or osteoporosis the result was as fallows 8 males [2.807%] and 277 female [97.193%] are osteoporotic and 29 [8.605%] male and 308 [91.395%] are osteopenia table 4.

The analysis of result according to age distribution of osteoporosis was significant at 51-60 years age group total 121 patient [42.456%] while osteopenia was significant at 61-70 years age group a total 101 patient [29.970%] table.

Sample Size Calculation and Statistical Analysis
Distribution of case according to the diagnosis
TOTAL % NO

Table2

Osteopenia	337	43.596%	773
Osteoporosis	285	36.869%	773

Total number =622 [80.466%] are diagnosed as osteopenia and osteoporosis and 151 [19.534%] are normal.

Table 3

Female	736	95.213%
Male	37	4.787%

Distribution according to gender
Osteopenia ------------ osteoporosis—
Table4

Gender	NO	%	No	%
Male	8	2.807%	29	8.605%
Female	277	97.193%	308	91.395%
Total	285	100%	337	100%

Osteopenia   Osteoporosis
Table 5

Age group	No	%	No	%
20-30	5	1.754%	9	2.671%
31-40	7	2.456%	21	6.231%
41-50	21	7.369%	51	15.134%
51-60	121	42.456%	89	26.410%
61-70	90	31.579%	101	29.970%
71-80	30	10.526%	56	16.617%
81-9.	11	3.860%	10	2.967%

DISCUSSION

Osteoporosis is reported to be a common problem among women in dial province especially after menopause. According to Mir Sadat Ali et al the reported incidence of osteoporosis varies between 50-60%.[10] They suggested that necessary steps should be taken to avoid osteoporosis and its complications which could end up in epidemic proportions. Many clinical guidelines recommend risk factor assessment and measurement of bone mineral density through DEXA scans.[11-12] In the present study, bone mineral density (BMD) was measured in 773 patients in the age group 20 ->80 years using QUs to find out the prevalence of osteoporosis and osteopenia The results showed that 80.466 % of the baquba resident had low BMD (36.869% had osteoporosis and 43.596% had osteopenia). It is very important to detect osteopenia early to prevent the development of osteoporosis and associated bone fractures.

In this present study, patient at age from 51-60 had osteoporosis and at age 61-70 had osteopenia. Mean age of warranting treatment to prevent fractures was close to the recommendations published in the international guidelines.[18]

The "gold standard" for identifying individuals with osteoporosis or at higher risk of osteoporotic fractures is bone mineral density as measured by DXA.[19] Nonetheless, the increasingly popular use of quantitative ultrasound at peripheral sites for measuring bone density in large populations confirms that ultrasound well discriminates between subjects at risk of fractures and those who are not and might be a reliable tool to identify individuals with osteoporosis and osteopenia.[20—21] Quantitative ultrasound measurement can be performed quickly, is relatively inexpensive, is portable, and involves less radiation, thereby being suitable for large epidemiologic studies.

In this study, we determined the prevalence of osteopenia and osteoporosis in a diyala population by using quantitative ultrasound at calcaneal bone and assessed by osteo pro device. The overall prevalence rates of osteopenia and osteoporosis that we observed are similar to those reported in several other studies in different countries, using either DXA[22][23] or quantitative ultrasound devices.[24-25] Women, because of the effect of menopause, are greatly affected by osteoporosis, as osteopenia is equally frequent in men and women. Notably, the prevalence of osteoporosis is from 4 to 5 times higher, respectively, in women and men aged 60–69 years in respect to those aged 50–59 years.[26] Such an increase is certainly due to the physiologic deterioration of bone tissue with aging, but it should also be noted in people older than 65 years[27] also osteopenia seen in some teens and young adults during and after sanction or embargo during 1991 until 2003, and they could have suffered malnourishment. Exposed to a period of inadequate calcium intake, they are more likely to suffer from osteopenia. This observation has been reported in 20-30 years, referring to populations that have experienced the sanction.

Women are more aware of being osteoporotic or osteopenia compared with men. Furthermore, men are less likely than women to receive treatment for osteoporosis, and this likely depends on the misconception that osteoporosis is a woman-only problem.

The present study has several limitations, this study was a cross-sectional survey, and we could not measure all factors affecting the risk of osteoporosis. Moreover, the ascertainment of exposure to many factors is not prior to the onset of the disease, making it impossible to reflect the real cause-effect relation and just allowing suggestion of a hypothesis. Though a prospective study is needed to confirm any association between osteoporosis and related factors, we observed many of the well-identified risk factors for osteoporosis. Another limitation has to do with the lack of data on some important environmental factors related to osteoporosis, such as calcium intake, for example. Finally, although the special population we studied could represent a limitation when generalizing results to other populations, the fact that the overall estimate of osteoporosis was similar to those reported in several other studies is reassuring.

This study also has some strength. Mainly, it is first one of the few population-based studies on osteoporosis, osteopenia and related factors conducted in a large sample of healthy diyala people. In addition, the high standard quality of data collection phases guaranteed a homogeneous and reliable assessment of the participants:

In conclusion, this study shows that osteoporosis in diyala adult population, as determined by quantitative ultrasound, is comparable with that found in different countries, but it appears to be underdiagnosed and undertreated, and intervention strategies should be considered to improve awareness and management of risk factors. Although it should not be considered as an alternative to DXA, quantitative ultrasound is faster, cheaper, and easier to use within general practice, so it could be used more widely in primary care centers to detect high-risk individuals who are the target group for preventing osteoporotic fractures.

Subjects would have been due to many factors like genetic, nutritional, and other environmental factors. They need to be looked at in further prospective studies.

The crude prevalence of osteoporosis in a study in menopausal patients in a study was 15%. Among premenopausal women, the crude prevalence of osteoporosis was higher in the urban areas compared with the rural areas. By contrast, in postmenopausal women osteoporosis was more in rural women than urban. QUS for screening of osteoporosis is a cost

effective method compared to the expensive DEXA (dual energy x ray absorptiometry.[27]

In other study shows that the prevalence of osteoporosis in Vietnamese adult women in Hanoi City, determined by QUS, is relatively high compared with that in nearby countries. The result in other study suggested that a substantial female population had osteopenia and osteoporosis after the age of 45 years. The incidence of osteoporosis was (20.25%) and osteopenia (36.79%) with maximum number of both osteoporosis and osteopenia women recorded in the age group of (55-64 years). After the age of 65 years, there was an almost 100% incidence of either osteopenia or osteoporosis, indicating that it increases with age and in postmenopausal period, thereby suggesting lack of estrogenic activity might be.[27]

The present study suggests that calcaneal QUS method utilizing same WHO T score criteria is a potential screening tool because of the low cost, feasibility, portability and helps in identifying osteopenia and osteoporosis in a population who otherwise shall remain undiagnosed and face the complications of osteoporosis. Healthy lifestyle (diet, exercise and sunlight exposure) can have a major positive impact on the bone health. These public health measures are recommended for the population at large as they are efficacious, safe and cost-effective. There is thus an urgent need for greater public awareness in this regard. For the middle aged and elderly, early detection and treatment of osteoporosis with available agents can significantly reduce the risk of fractures and associated morbidity and mortality.

CONCLUSION
Osteoporosis is an underreported public health problem. In our study, we Attempted to look at the prevalence of osteoporosis and the osteopenia in province of diyala. A significantly larger proportion of otherwise normal healthy women in our community had osteoporosis and osteopenia compared to previously published studies. Large number of men needs to be included in future studies BMD. Large scale prospective studies with interventions are needed to look at the reduction in the end points like number of incident fractures and morbidity associated with them. The study shows that there is a higher prevalence of osteopenia when compared to osteoporosis in. The results indicate that osteoporosis can be prevented with adequate therapeutic measures.

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