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Research Article

Evaluating the Clinical Outcomes of Patients who suffered from Osteoporosis in Correlation with Stature Loss.

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Article Info
Article history:
Received 14 -12-2025
Received in revised form 7-1-2026
Accepted 26-4-2026
Available online 30 -6 -2026
Keywords: Osteoporosis (OP); Dual X-ray absorptiometry (DXA); BMI; and symptoms.

Abstract

Osteoporosis (OP) is a bone disorder that impacts the whole body by reducing the organic and inorganic content of comminuted fractures, with dual X-ray absorptiometry (DXA) being the present-day gold standard in the diagnosis of osteoporosis and the likelihood of fracture. A total of 115 patients (male and female, aged between 10 and 87 years) were analyzed in this paper. We discovered that the highest prevalence rate of fragility was obtained in the age group of 60 to 69 years (65.2%). The bones which are weak by definition are osteoporotic. A cross-sectional clinical evaluation of 115 patients with osteoporosis and an analysis of gender and age distributions were carried out. Involvement of the hip joints and spine was identified via imaging, and BMI was summarized with the help of descriptive statistics. The findings revealed that there was a strong gender bias, with 84.3% of the females (97/115) and 15.7% of the male patients (18/115) having osteoporosis. The age distribution showed that the majority of cases were among patients between 60 and 69 years (65.2, 75/115). In imaging, it was shown that females (17) more frequently had involvement of the hip joint, as well as spine (80) involvement, in comparison to males (17). The mean BMI was 28.39 (range: 19.10–38.77). To sum up, older females were the most vulnerable group to osteoporosis in this cohort, and the hip joint and spine were more likely to be affected. The bone gets weak and fractured due to osteoporosis, and this factor makes a person short.

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Peer review under responsibility of Iraqi Academic Scientific Journal and University of Kerbala.

Introduction:

Osteoporosis is a skeletal systemic disorder, where bone mineral density (BMD) and bone strength are decreased, so that the skeleton becomes vulnerable and highly fractured [1]. Osteoporosis mainly occurs in people above 50 years of age worldwide, with a high prevalence rate being witnessed among postmenopausal women. It is observed to be caused by several etiological factors, both non-modifiable, which are age, sex, genetic predisposition, and hormonal changes, and modifiable factors, such as insufficient calcium and vitamin D intake, lack of exercise, cigarette use, and prolonged use of drugs such as glucocorticoids [2]. It is estimated that the incidence of osteoporotic fractures will increase to about 50 percent of the existing global incidence by 2025. Fracture sites that are clinically significant include mostly the vertebral spine, the hip (proximal femur), and the wrist (distal forearm).

Dual-energy X-ray absorptiometry (DXA) is the most common clinical technique of diagnosing and monitoring osteoporosis. DXA is regarded as the reference standard, which allows to detect osteoporosis, helps estimate the risk of fracture, and longitudinally evaluates changes in the BMD over time. DXA workflow is generally a process which includes acquiring the image, and then processing and analysis and reporting. Osteoporosis and fractures have multifactorial mechanisms, which means that risk stratification must take into account a variety of determinants [3]. The main risk factors are low peak bone mass, inadequate intake of calcium, sedentary lifestyle, and smoking; others also include prolonged steroid treatment and premature ovarian insufficiency. The general bone health is an indicator of the aggregate effects of age, genetics, nutrition, physical activity level, and hormonal status. Since fracture risk is a multifactorial phenomenon, it is important to establish the most common risk factors in particular high-risk groups, to be able to diagnose and treat them correctly [4,5].

Age is always a relevant risk determinant of osteoporosis. As age advances, there are changes in sex steroid profiles, and in both men and women, in old age, there increase in bone loss is associated with age-related changes in bone remodelling. It is approximated that half of the women and about 20% of men aged 50 years or above will have at least one osteoporotic fracture in their lifetime. To this end, clinical practice guidelines suggest regular screening of osteoporosis in all postmenopausal women and the formal BMD testing of women aged >65 years, with BMD testing in younger women who have high clinical risk factors [6,7].

Materials & methods:

Study design We observed 115 subjects (age 10-87), 97 girls and 18 boys. We assessed the device in terms of osteoporosis diagnosis through the use of X-ray images. We examined osteoporosis in Karbala and noted that women were more affected by it than men, with a prevalence of 15.7% among women. It was a descriptive cross-sectional study, which took place at the Al-Hussein Medicaid Hospital within the period of November 14, 2022, and February 25, 2023. It is a state-owned hospital that is open to referrals by all the major hospitals in Baghdad and the surrounding areas. It is a unit dealing with osteoporosis which has a dual-energy X-ray absorptiometer, or DXA, to measure the T-scores of the patients. A T-score of an individual is determined as follows: T-score = (BMD-YN)/SD, in which the bone mineral density measured is BMD, the normal bone density a patient should have at the age of the young adulthood is YN, and SD is the standard deviation of a population.

Patient position

The body fat index is the ratio of the body mass index (BMI) (kg/m 2), and the bone density tests are also erroneous with the presence of contrast dye. The various types of BMI of adults based on WHO are as follows: less than 18.5 kg/m 2 lean; 18.5-25kg/m 2 normal; 25-30kg/m 2 overweight; 30kg/m 2 and above obese; 35kg/m 2 and above severely obese.

Statistical Analysis

The SPSS version 25 was used to analyze the data of the study. We have given the results in the form of basic frequencies, percentages, means, standard deviations, and ranges (minimum -maximum). The alternative of two quantitative categories of a Student was analyzed by the use of a t-test. We had qualitative data, we adopted a Pearson chi test that was corrected with Yates, and where the figure of expectations was not high, and we utilized the Fisher exact test.

Results:

Table 1: Distribution of the prevalence of osteoporosis on the patients by gender (n=115)

gender	number	Percentage%
male	**18**	**15.7**
female	**97**	**84.3**
Total	**115**	**100.0%**

Based on Table 1, the results show the high prevalence rate of Osteoporosis. In females, 97 (84.3%) followed by 18 (15.7%) in males, respectively. Due to that, the disease was gender bias, $p<0.05$.

Table 2: Distribution of patients based on age (n=115)

Age groups	number	Percentage%
10-19	2	1.7
20-29	2	1.7
30-39	2	1.7
40-49	15	13.0
50-59	11	9.6
60-69	75	65.2
70≤	8	7.0
Total	**115**	**100.0%**

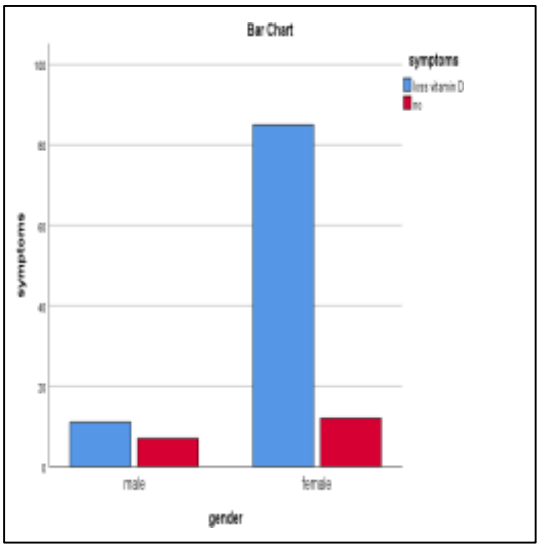

Figure 1: Distribution the symptoms and loss of vitamin D obtained from both males & females.

Table 3: Diagnostic the outcomes of the injured location in both hip joints and spin for patients.

		The Parts		*Total*
		hip joint	***spin***	
gender	male	1	17	18
	female	17	80	97
Total		18	97	115

From Table 3, it shows that the number of females with osteoporosis and injury to the hip joint was 17, while the number of males was one, while the Number of females with osteoporosis in the spine was 80, while the number of males was 17.

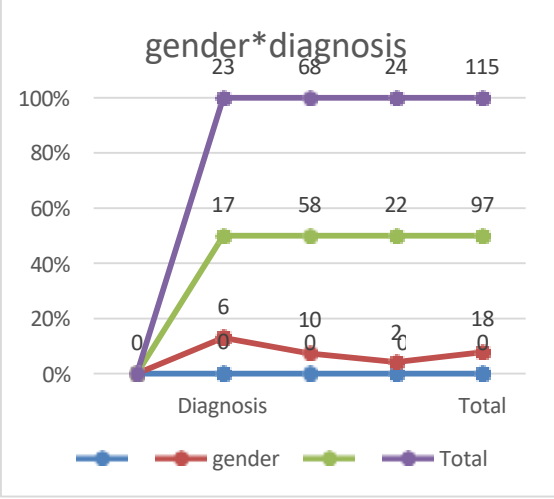

Figure 2: A correlation between genders alongside with diagnoses of osteoporosis.

Figure 2 shows that the number of normal females was 17, while the number of males was 6, while the number of female patients with osteoporosis was 58, while the number of males were 10, while the number of females with softness was shown, while the number of males was 2.

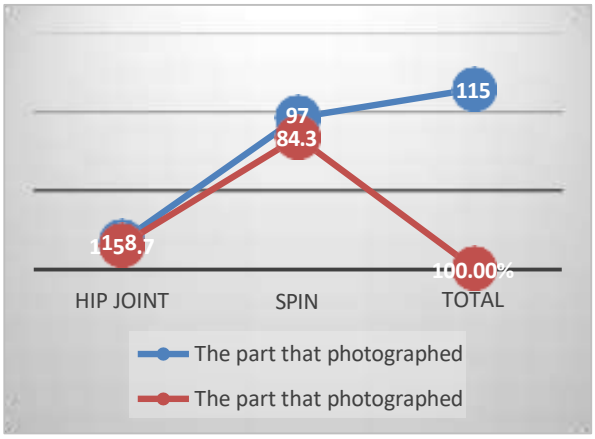

Figure 3: Identify the part of the injury detected in both genders

Table 4: Distribution of osteoporosis patients based on BMI

BMI	N	Minimum	Maximum	Mean	Std. Deviation
BMI	115	19.10	38.77	28.3931	4.55790

The Figure shows the BMI, where the number of diseases was 115, and the minimum BMI for patients with osteoporosis was 19.10 and, the maximum disease with osteoporosis was 38.77, and the average BMI was 28.39.

Results & Discussions:

The current results are widely in agreement with the previous studies that have indicated that women have a greater predisposition to osteoporosis compared to men. This is a sex-specific difference that can be significantly explained by postmenopausal alterations that are known to have a negative impact on the bone mineral density due to changes in the bone remodeling processes and skeletal homeostasis (8,9).

Estrogen is a key regulator of skeletal metabolism because it regulates the activities of osteoblasts and osteoclasts. The growing body of evidence suggests that a higher age is related to the increased.

Moreover, poor status of vitamin D also leads to impaired bone mineralization and bone fragility, and thus makes an individual prone to osteoporotic fractures, especially at clinically important locations like the hip and spine (10).

In the present research, the relationship between body mass and osteoporosis was not statistically significant ($p > 0.05$). This is contrary to the previous studies that had shown correlations between body weight and the bone mineral density (BMD). The low body mass index (BMI) is a significant predictor of impaired BMD, although it is not statistically linked to compromised BMD in our dataset. Specifically, low BMI has been

found to be a negative predictor of BMD among those with irregular menstrual cycles and/or eating disorders, and it could be a predictor of the increased bone loss in both adults and younger individuals. Moreover, height has also been shown as a possible correlate of the risk of osteoporosis, and height variations are indicators of cumulative skeletal and developmental processes that can affect bone strength and bone vulnerability to fractures (11 - 13).

Conclusion

Finally, bone volume and trabecular separation were found to be reduced and higher in the osteoporotic trabeculae in this study. Nevertheless, no meaningful changes in material properties and mechanical behavior or parameters of tissue mineralization were observed within the framework of the current analyses. Low bone density is the condition known as osteoporosis and is a clinically significant condition that predisposes a person to bone fractures.

The findings also indicate that low spinal bone density might be a cause of low height (short stature), which is a typical clinical feature of osteoporosis. This finding is in line with the past evidence that osteoporotic decay results in structural frailty and a high propensity to brittle fractures, which may clinically present as an apparent decrease in height with time.

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