Evaluation of the Relationship between Osteoporosis and Weakened and Shattered Bones, Which Makes a Person Appear Shorter

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Abstract: Osteoporosis (OP) is a bone disease that affects the entire body by decreasing the organic and inorganic components of bone tissue, where dual X-ray absorptiometry (DXA) is the current "gold standard" for diagnosing osteoporosis and predicting the risk of fractures. This study analyzed 115 patients, including males and females aged between 10 and 87 years, between 14th November 2022 and 25th February 2023. According to our results, the DEXA device was used to assess bone density diagnosis capabilities. Our outcomes found that the age group between 60-69 years got the greatest prevalence rate (65.2%) for fragility. The osteoporosis monitor was found to be a precise method for detection. Additionally, the osteoporosis device can diagnose a variety of related diseases, and the Dexa device is considered one of the most effective tools for imaging and diagnosing bone density. Furthermore, our results were similar to previous studies and studies that proved this. Osteoporosis causes bones to become weak and fracture, which can also cause a person to become shorter.

Keywords: Osteoporosis (OP); Dual X-ray absorptiometry (DXA); BMI; and symptoms.

INTRODUCTION

Osteoporosis is the most frequent metabolic bone disease as well as a severe health concern in the skeletal system. It is characterized by reduced bone mineral density, making damaged bones brittle. [j.pharmthera, 2022; Sözen, T. *et al*., 2016]. Osteoporosis affects women and males over the age of 50. Low peak bone mass, hormonal variables, the use of certain medicines, smoking, lack of physical exercise, lack of calcium and vitamin D, race, small body size, and a family history of skeletal problems are all risk factors for osteoporosis [Pisani, P . *et al*., 2013]. It is predicted that the worldwide fracture rate would increase by 50% by 2025. Osteoporotic fractures are those that occur in the vertebrae, which include the spine, proximal femur, hip, and distal forearm, which includes the wrist. [Watts, N. B, 2011; Albanese, C. V. *et al*., 2010]. Dual-energy X-ray absorptiometry (DXA) can present the gold standard that have estimated bone mineral density, identifying osteoporosis, and tracking changes in BMD over time. The DXA scanning procedure's four phases--scan acquisition, processing, interpretation, and reporting--are also utilized to estimate fracture risk. [D'Amelio, P. *et al*., 2015- Lee, S. R. *et al*., 2005].

Literature study showed several risk factors for developing osteoporosis. Guthrie, (2000) and Kelsey, (1989) both suggest that low bone mineral density, low calcium intake, low physical activity, and smoking are risk factors for osteoporosis. Kelsey, (1989) also suggests that prolonged use of corticosteroids and removal of the ovaries at an early age are risk factors. McClung, (2000) highlights that bone health is determined by various factors such as age, genetics, diet, physical activity, and sex hormones. Kanis, (1998) acknowledges that the cause of osteoporotic fractures is complex, and a comprehensive identification of potent risk factors can assist in recognizing patients who might benefit from evaluation and management.

These papers indicate that age is a significant risk factor in developing osteoporosis. As found by Khosla in 2005, age-related changes in sex steroid production or availability contribute to age-related bone loss in both genders. Coughlan's 2014 estimate suggests that 50% of women and 20% of men aged over 50 will encounter an osteoporosis-related fracture. Lane, (2006) notes that all postmenopausal women should undergo evaluation for indications of osteoporosis during regular physical assessments. Radiologic and laboratory evaluations of bone mineral density should be reserved for those at high risk, including all women aged 65 and above.

PATIENTS AND METHODS

Study Design

The ages of our 115 participants varied between 10 to 87 years in our study of 97 girls and 18 males. The diagnostic efficacy of this gadget for osteoporosis diagnosis was evaluated using X-rays. Our findings in Karbala revealed that females had a greater prevalence of osteoporosis than males, having 15.7% of the female population afflicted. This was a descriptive cross-sectional study that was conducted at Al-Hussein Medical Hospital during November 14th, 2022, and February 25th, 2023. Al-Hussein Medical Hospital

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is a governmental/general hospital that accepts referrals from all referral hospitals as well as hospitals in and surrounding Baghdad. At the osteoporosis unit, STRATOS37661 DXA equipment, built in France, is used to determine the T-scores of patients with osteoporosis through the Dual-energy x-ray absorptiometry scan (DXA). The T-score is calculated by subtracting the expected young normal value (YN) from the bone density (BMD) measurement and dividing the result by the population standard deviation (SD): T-score = BMD – YN/ SD.

Patient Position

Preparation of the patient: Avoid wearing clothing with metal straps and buttons. Items that would be in the scanning area, such as wallets or keys, should be removed. You may eat and drink as normal on the day of the scan. Avoid taking calcium supplements for 24 hours before the scan. Wait seven days before having a DXA scan if you have recently had a barium meal or contrast injection for a CT or MRI scan. Body mass index (BMI), also known as kilograms per square metre (kg/m2), measures how much body fat a person

has. Your bone density test may not be accurate if contrast dye is used. The WHO classification of adult BMI has been used to categorise BMI: BMI < 18.5 kg/m2 is considered lean, 18.5 to 25 kg/m2 is considered normal, 25 to 30 kg/m2 is considered overweight, 30 kg/m2≤ is considered obese, and 35 kg/m2≤ is considered severely obese. BMI is easily calculated using the formula weight (kg)/height (metres).

Statistical Analysis

(Statistical Packages for Social Sciences - version 25) was used to analyse the data obtained from the current study. Simple frequency, percentage, mean, standard deviation, and range measurements were used to present the data (minimum-maximum values). The student's t-test was used to test the significance of differences between two separate sets of quantitative data. For the chi-squared test (c2-test) with Yate's correction or Fisher's exact test, findings were verified using the Pearson chi-squared test (c2-test) with Yate's correction (qualitative data).

RESULT

Table 1: Distribution of patients based on 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%

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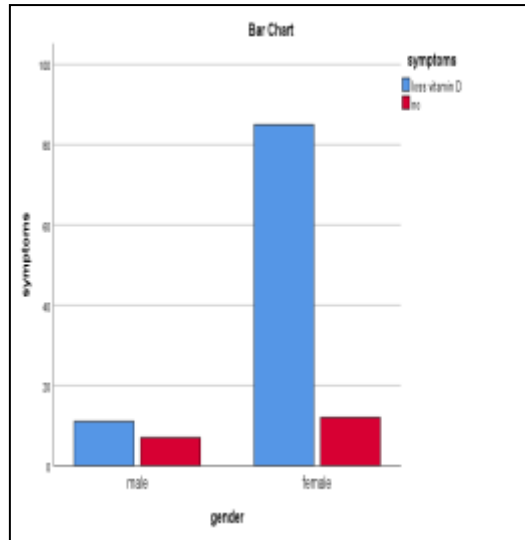*Sarc. Jr. med. Sci. vol-2, issue-10 (2023) pp-1-5*

Figure 1: Determinations of the gender with osteoporosis.

Figure 1 shows the number of females with osteoporosis as a result of vitamin D deficiency was observed, *while the number of males was 11, as the number of females with osteoporosis was also observed for other symptoms, while the number of males was 7.*

Table 3: Notify the part photographed.

		The part that was photographed		Total
		hip joint	spin	
gender	male	1	17	18
	female	17	80	97
Total		18	97	115

From Table 3 it shows 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.
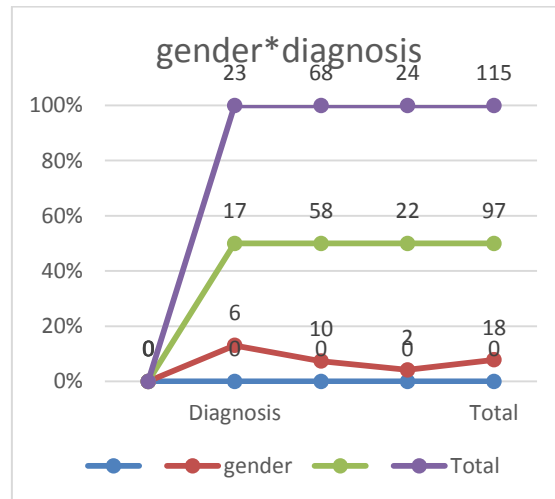

Figure 2: Gender * Diagnosis

Figure 2 shows the number of normal females 17, while males 6, while the number of female patients with osteoporosis was 58, while males were 10, while the number of females with softness was shown, while males 2.
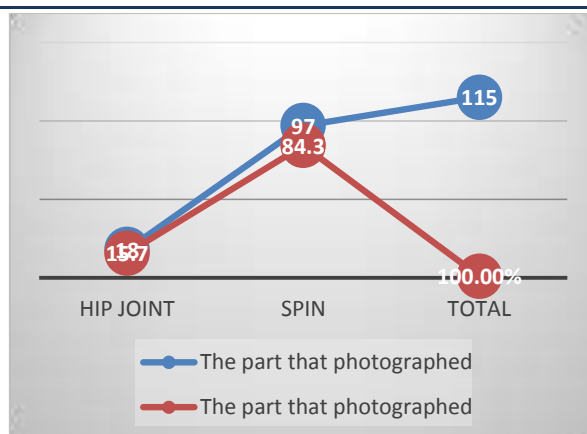
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Figure 3: Identify the part of the photographed number of genders

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.

DISCUSSION

Our outcomes were similar to previous studies, which found that women have more cases to develop osteoporosis in comparison with men because hormonal changes after menopause have a direct effect on bone density. The female hormone estrogen is crucial for bone health. Previous studies noticed that the risk of developing osteoporosis can increase with age. Decrease of Vitamin D has caused a loss in bones, which causes osteoporosis that results to fractures as well as it can effect on the bone structures, which include the hip and spine.

It was discovered that there was no association between body mass and osteoporosis p-value >0.05, which contradicts prior studies and research that stated the following. Body weight is proportional to bone mineral density (BMD) [Keene, G. S. *et al.*, 1993- Cummings, S. R. *et al.*, 2006]. In the absence of menstruation and/or eating disorders, a low body mass index (BMI) has been recognized as a significant risk factor for reduced BMD and predicts more bone loss in later age and in younger persons. [Cummings, S. R. *et al.*, 2010] It has been discovered that there is a link between the patient's height and the occurrence of osteoporosis. [Dell, R. M. *et al.*, 2009]

CONCLUSION

We conclude from this study found that osteoporotic trabecular had lower bone volume and larger trabecular separation but no significant changes in material or mechanical behavior or tissue mineralization, and osteoporosis is characterized by low bone density, which increases the risk of fractures.

We conclude from this study that a decrease in bone density in the spine would cause short stature, which is a common symptom of osteoporosis.

And outcomes were consistent with previous studies, which confirmed this where Osteoporosis causes bones to weaken and shatter, making a person appear shorter.

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