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Body mass index (BMI) and bone marrow density (BMD) of osteoporosis in Mosul city

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Abstract
Objective: The article is aimed to provide a relation between body mass index and bone marrow density in osteoporosis in Mosul city.
Patients and Method: Its case series study done from August 2019 to June 2020 in Mosul city. Body mass index (BMI) was calculated; the assessment of bone marrow density (BMD) was done for our patients by dual energy X-ray absorptiometry (DXA) and classified according to WHO with statistical analysis performed by SPSS version 25.
Results*:* results were osteoporotic patients 423 (68.2%) with Tscore (>-2.5), the osteopenic 93 (15%) with Tscore (-1_-2.5), and normal Tscore (<-1) was 104 patients (16.8%).)
Conclusion: body mass index and bone marrow density in osteoporosis is correlated, and osteoporosis was more above the age of 60 in Mosul city.

Keywords: BMI, BMD, Osteoporosis

Introduction

Osteoporosis or porous bone, is a silent disease characterized by low bone mass, leading to bone fragility and an increased risk of fractures of the hip, spine, and wrist. Men and women are affected by osteoporosis [1], which can be prevented and treated. It is a major public health problem and more common in women and older people. It causes more than 8.9 million fractures worldwide annually. Women are considerably at a higher risk for osteoporosis, affect about 200 million women all over the world [2]. It is asymptomatic disease, and the first clinical manifestation of osteoporosis is often a low-trauma fragility fracture [3]. One in two women and up to one in four men will break a bone in their lifetime due to osteoporosis. For women, the incidence of osteoporosis is greater than heart attacks, stroke and breast cancer in combination [4]. Different studies have shown a protective role of obesity against osteoporosis but recent evidence suggests that obesity, and thus fat mass, may prove to be risk factors for decreased bone density and fractures [5, 6]. In addition to that, obesity occurs mostly due to genetic and environmental factors. Estrogen deficiency in postmenopausal women is associated with obesity while estrogen therapy can reduce visceral fat tissue, so as women became menopause, their risk of developing obesity and metabolic syndrome increases by more than 3 times compared to before menopause [7, 8]. Untreated osteoporosis will lead to an even higher risk of further fragility fractures that experts have termed a “fracture cascade [9]. Currently, we are using Western software in our DEXA guidelines in diagnosing osteoporosis Which appear in DEXA machines from Mosul locality, to make them our resources in osteoporotic researches. It is important study to determine fragility fractures and so to minimize risk of osteoporotic fractures. Patients were 620 send to Dexa machine from many areas in and around Mosul city, 423 of them were above 50 and were osteoporotic.

Patients and Methods

This study is conducted on population collected from Mosul city (at the northern part of Iraq) and all its districts, from the beginning of August 2019 to end of June 2020, total number involved in our study are 620 patients. Data are collected from the DEXA machine unit (Hologic QDR 4500A fan-beam dual energy X-ray absorptiometry) (DXA) at the private sector in Mosul city, we included patients from (15-87) years old in that period of time, the number of males patients were (61) while the majority of our studied group were females (559).Statistics were done with SPSS program version 25.

Results

Patients above 50 (regarded as menopausal), the mean age (63.9), they were 423, with males 40 (8.47%), females 383 (91.53%),

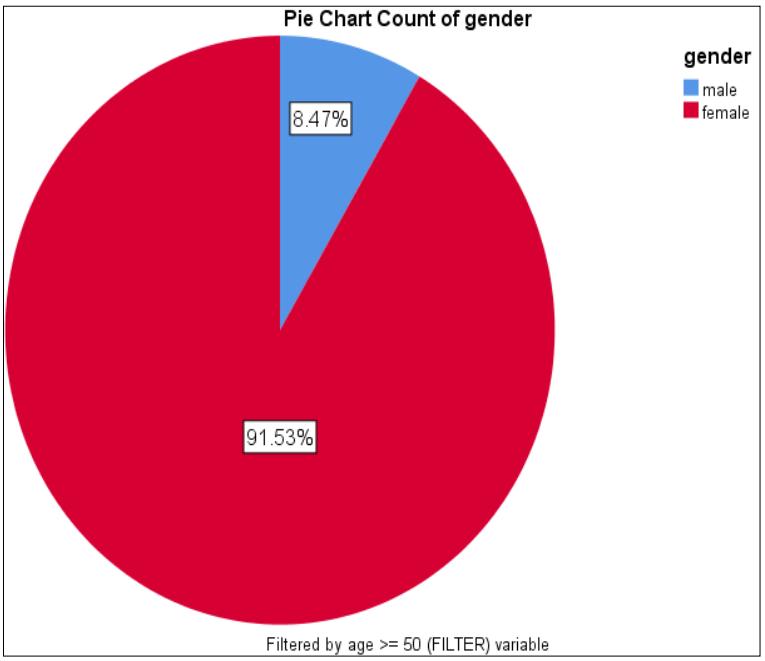

Fig 1

Osteoporosis, osteopenia, and normal T score patients and their percentages were displayed in table below.

Table 1: T Score

All referred cases (620) with their T scores					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Osteoporosis	423	68.2	68.2	68.2
	Osteopenia	93	15.0	15.0	83.2
	Normal	104	16.8	16.8	100.0
	Total	620	100.0	100.0	

In addition, anthropometric parameters assessed were weight, height, and BMI, so Mean BMI kg\m^2 (37.0), Mean BMD (37.03). Ethnic groups were nearly almost Caucasians, which was not needed statistics. In addition, we found that the relation between BMI kg\m^2 of patients and BMD was significant P value (. 004),

Table 2: The Correlations

		BMI kg\m2	**T scores**
BMI kg\m2	Pearson Correlation	1	.138**
	Sig. (2-tailed)		.004
	Sum of Squares and Cross-products	152375.299	1195.242
	Covariance	361.079	2.832
	N	423	423
T scores	Pearson Correlation	.138**	1
	Sig. (2-tailed)	.004	
	Sum of Squares and Cross-products	1195.242	489.012
	Covariance	2.832	1.159
	N	423	423
**. Correlation is significant at the 0.01 level (2-tailed).			

The area scanned was mostly spine (388), and femur (143) (left or right), P value (. 000).

Table 3: The Validity

		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Spine	388	73.1	73.1	73.1
	Femur	143	26.9	26.9	100.0
	Total	531	100.0	100.0	

Discussion

We depend on WHO criteria for diagnosing osteoporosis and low bone mass [10]. We considered menopausal age 50 and above, using lumbar spine and femoral neck BMD scan, depending on the article published in the united states [11], The prevalence of osteoporosis and osteopenia are found to increase steeply after the age of 50 years, which was similar to other studies [12], We found that 423 patients (68.2%) of 620 above 50 having osteoporosis (>= -2.5), 40 of them were male (9.5%), females 383 (90.5%), similar to that seen in India [13], but may be less prevalence (ranged from 9 to 38 % for women and 1 to 8 % for men) of osteoporotic patients seen in other studies [14] due to cases selection which were sent to DEXA machine by doctors and not like the rest of the studies that took random samples from the community. With 93 (15%) patients had osteopenia (-1_-2.5) and 104 (16.8%) had normal T score. In addition, we found that the relation between BMI (37.0 kg\m$^{2)}$ and BMD was significant P value (. 004). Which means that there is a positive correlation between (Class 2: BMI of >35) and osteoporosis, this was seen also by Andrea Palermo and his colleagues who said' white adipose tissue, secretes several hormones called adipokines and inflammatory factors that may in turn promote bone resorption' [15, 16]. The areas scanned were mostly spine (388), and femur (143) (left or right), so the spine affected more by osteoporosis P value (. 000), not like other study done by Azza M. Abdelmohsen which found both spine and hip BMD decreased by nearly the same percentage in postmenopausal women [17].

Conclusion

Body mass index and bone marrow density in osteoporosis is correlated, and osteoporosis was more above the age of 60, there were a small number of patients in this study in relation to other studies and may need a large number to confirm or deny the results that we have reached.

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