

## Original Article

## FREQUENCY OF LOW BONE MINERAL DENSITY IN LOCAL POPULATION AT RAHIM YAR KHAN

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**Objective:** To determine the frequency of low bone mineral Density in different age groups and sex of local population at Sheikh Zayed Medical college, Rahim Yar Khan .

**Methods:** This cross sectional comparative study was carried out at the Outpatient Department of Medicine Sheikh Zayed Medical college Rahim Yar Khan from January 2016 to December 2016. Patients from both genders were recruited for the study. Three thousand fifty two patients were included in the study. Brief history was taken and height and weight were recorded and Bone Mineral Density (BMD) was calculated. Bone mineral density was measured in all patients by DXA scan.

**Results:** Out of 3052 patients, 37.1% belong to age less than 30 years and 47.9% belong to age between 31 to 50 years and 15% were more than 50 year of age. Out of 3052 patients, 42.5% were male and 57.5% were female. Out of these patients 1809 (59.3%) had normal BMD while 1243 (40.7%) had abnormal BMD. out of these, 1142 patients (37.4%) had osteopenia, while 101 patients (3.3%) had osteoporosis. The lowest BMD values were observed in the age group more than 50 years, where 47.1% had normal BMD, 40.5% had osteopenia and 8.1% had osteoporosis. While in the age group between 31-50 year, 58.3% had normal BMD, 38.7% had osteopenia and 2.9% had osteoporosis. While in age group less than 30 years 65.4% patients had normal BMD, 32.7% had osteopenia and 1.9% had osteoporosis. Regarding sex, out of 1297 male patients 57.2% had normal BMD. 39.2% had osteopenia and 3.6% had osteoporosis. Out of 3052 patient 1755 were female. About 60.8% had normal BMD, while 36.1% had osteopenia and 3.1% had osteoporosis.

**Conclusions:** The study showed high prevalence of low bone mineral Density in local population of Rahim Yar Khan in both females as well as males. This study showed that in comparison with female, male patients also need special attention to their bone health.

**Keywords:** bone mineral density, osteopenia, osteoporosis.

## Introduction

Osteoporosis is a skeletal disorder characterized by a loss of bone osteoid that reduces bone integrity and bone strength, predisposing to and increase the risk of fractures.<sup>1</sup> The frequency of fracture varies with ethnicity, sex, and age.<sup>2</sup> Osteoporosis can be caused by a variety of factors, the most common causes are aging, sex hormone deficiency, alcoholism, smoking and high dose glucocorticoid administration. Salty food preference and coffee consumption is also associated with osteoporosis.<sup>3,4</sup> Greater Intake of Fruit and Vegetables Is associated with Greater Bone Mineral Density and Lower Osteoporosis Risk in Middle-Aged and Elderly Adults.<sup>5</sup> Certain diseases like rheumatoid arthritis, renal diseases and chronic obstructive pulmonary diseases.<sup>3,6</sup> Low level of vitamin D and heavy metal exposure is also considered risk factor for osteoporosis.<sup>7,8</sup> Low lean mass is associated with osteopenia and osteoporosis.<sup>9</sup> Smoking and chronic hepatitis is also associated with

osteoporosis.<sup>10,11</sup> Bone mineral density is typically expressed in  $\text{g}/\text{cm}^2$  per  $\text{cm}^2$ , for which there are different normal ranges for each bone and for each type of dual energy x-ray absorptiometry (DXA) measuring machine.<sup>2,8</sup> The T score is a simple way of reporting bone density in which the patient's bone mineral density is compared to the young normal mean and expressed as a standard deviation score.<sup>1,2,12</sup> The world health organization has established criteria for defining osteoporosis based upon the T score. Surveillance with DXA bone densitometry is recommended for postmenopausal woman and elderly men with a frequency according to their T score. DXA scan should be obtained every 5 years for T score -1.0 to -1.5, every 3-5 years for score -1.5 to -2.0, and every 1-2 years for score under -2.0.

## Methods

This cross sectional comparative study was carried out at the Outpatient Department of Medicine Sheikh Zayed Medical college Rahim Zayed Medical

college Rahim Yar Khan from January 2016 to December 2016. All the patients were included through non-probability purposive sampling. After informed consent, brief history was taken. Ethnicity was determined by asking the place of origin. Patients of both genders were recruited for the study. Height and weight were recorded in cm and kg respectively. BMD was calculated. Bone density was measured in all patients by DXA scan Pegasus smart serial no 0114 PG 2183. To cover technical aspects and errors we checked BMD by using same machine and same operator.

Data had been analyzed using SPSS version 20. Mean and standard deviation (SD) were calculated for qualitative variables while frequency and percentages were calculated for quantitative variables. Chi-square test was applied to study association of bone mass with gender. A p-value < 0.05 was considered as significant.

**Results**

Out of 3052 patients, 37.1% belong to age less than 30 years and 47.9% belong to age between 31 to 50 years and 15% were more than 50 year of age (**table 1**). Out of 3052 patients, 42.5% were male and 57.5% were female(**table 2**). Out of these patients 1809 (59.3%) had normal BMD (bone mineral density) while 1243 (40.7%) have abnormal BMD. out of these patients with abnormal bone mineral density, 1142 patients (37.4%) had osteopenia, while 101 patients (3.3%) had osteoporosis (**table 3**). The lowest BMD values were observed in the age group more than 50 years, where 47.1% had

normal BMD, 40.5% had osteopenia and 8.1% had osteoporosis. While in the age group between 31- 50 year, 58.3% had normal BMD, 38.7% had osteopenia and 2.9% had osteoporosis (**table 4**). While in age group less than 30 years 65.4% patients had normal BMD, 32.7% had osteopenia and 1.9% had osteoporosis. Regarding sex, out of 1297 male patients 57.2% had normal BMD. 39.2% had osteopenia and 3.6% had osteoporosis. Out of 3052 patient 1755 were female. About 60.8% had normal BMD, while 36.1% had osteopenia and 3.1% had osteoporosis(**table 5**).

**Table-1:** Age distribution.

	Age	Frequency	Percent	Valid percent	Cumulative%
Valid	10-30 years	1131	37.1	37.1	37.1
	31-50 years	1462	47.9	47.1	85.0
	>50 years	459	15.0	15.0	100.0
	Total	3052	100.0	100.0	

**Table-2:** Sex distribution.

	Sex	Frequency	Percent	Valid percent	Cumulative%
Valid	Male	1297	42.5	42.5	42.5
	Female	1755	57.5	57.5	100.0
	Total	3052	100.0	100.0	

**Table-3:** Bone mineral density.

	BMD	Frequency	Percent	Valid percent	Cumulative%
Valid	Normal	1809	59.3	59.3	59.3
	Osteopenia	1142	37.4	37.4	96.7
	Osteoporosis	101	3.3	3.3	100.0
	Total	3052	100.0	100.0	

**Table-4:** Age/Bone Mineral Density (Crosstabulationcan.).

		Normal	Bone Mineral Density Osteopenia	Osteoporosis	Total	
<b>10 - 30 yrs.</b>	Count	740	370	21	1131	
	% Within Age	65.4%	32.7%	1.9%	100.0%	
	<b>Age</b>	% Within Osteoporosis	40.9%	32.4%	20.8%	37.1%
		% of Total	24.2%	12.1%	0.7%	37.1%
<b>31- 50 yrs.</b>	Count	853	566	43	1462	
	% Within Age	58.3%	38.7%	2.9%	100.0%	
	% within Osteoporosis	47.2%	49.6%	42.6%	47.9%	
	% of Total	27.9%	18.5%	1.4%	47.9%	
<b>&gt; 50 yrs.</b>	Count	216	206	37	459	
	% Within Age	47.1%	44.9%	8.1%	100.0%	
	% Within Osteoporosis	11.9%	18.0%	36.6%	15.0%	
	% of Total	7.1%	6.7%	1.2%	15.0%	
<b>Total</b>	Count	1809	1142	101	3052	
	% Within Age	59.3%	37.4%	3.3%	100.0%	
	% Within Osteoporosis	100.0%	100.0%	100.0%	100.0%	
	% of Total	59.3% <sup>5</sup>	37.4%	3.3%	100.0%	

**Table-5:** Sex/Bone Mineral Density (Cross tabulation)

		Normal	Bone Mineral Density Osteopenia	Osteoporosis	Total
<b>Male</b>	Count	742	508	471	1247
	% Within Age	57.2%	39.2%	3.6%	100.0%
	% Within Osteoporosis	41.0%	44.5%	46.5%	42.5%
	% of Total	24.3%	16.6%	1.5%	42.5%
<b>Female</b>	Count	1067	634	54	1755
	% Within Age	60.8%	36.1%	3.1%	100.0%
	% within Osteoporosis	59.0%	55.5%	53.5%	57.5%
	% of Total	35.0%	20.8%	1.8%	57.5%
<b>Total</b>	Count	1809	1142	101	3052
	% Within Age	59.3%	37.4%	3.3%	100.0%
	% Within Osteoporosis	100.0%	100.0%	100.0%	100.0%
	% of Total	59.3%	37.4%	3.3%	100.0%

## Discussion

Osteoporosis is a major problem of health care delivery services, both in the developed and developing countries. It is a common public health problem which has significant mortality and morbidity due to associated fracture risk. In a study, Bone mass density was lower in immigrant women from Somalia who were living in Sweden, in relation to both the American and the African-American populations. Vitamin D supplementation should be considered to prevent osteomalacia, osteoporosis and future fractures.<sup>13</sup> Evidence from one other trial of screening to prevent osteoporotic fractures suggests that treatments reduce the risk of hip, vertebral and non-vertebral fractures.<sup>14</sup> A study on osteoporosis in men shows that Osteoporosis in men remains under-diagnosed and less appreciated. After a minimal trauma and fracture, men usually do not seek evaluation and treatment. The lifetime risk for osteoporotic fracture in older men may range from 13 to 25%. Due to fear of side effects of treatments and other reasons management in men at risk for fracture is challenging.<sup>15</sup> So it is important to know about its prevalence in our population. After the

initial observations and definitions of osteoporosis based on Caucasian populations, systematic research in Asian populations started in the 1980s. Significant variations between different ethnic groups with respect to the rate of osteoporotic fractures, bone mineral density and disease risk factors emerged from the data. Osteoporosis is therefore not a homogeneous disease across the world. There is very limited work done in Pakistan for measuring the frequency of this serious health problem.

## Conclusion

The study showed high prevalence of low bone mineral density in local population of Rahim Yar Khan in females as well as in males. This study showed that in comparison with female, male patients also need special attention to their bone health. The results in various ethnic groups are comparable, however various factors are affecting bone health so, further multicentre studies at larger scale are recommended.

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