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Research Article

ANALYSIS OF RISK FACTORS ASSOCIATED WITH
DECREASED BONE MINERAL DENSITY

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Abstract:

Introduction: Osteoporosis is characterized by low bone mass and damaged structural integrity that lead to increased risk of bone fracture. Osteoporosis is defined as a systemic skeletal disorder in which low bone mass and deterioration of bone architecture occur. **Aims and objectives:** The basic aim of the study is to find those risk factors which are associated with decreased bone mineral density. **Methodology of the study:** This study was conducted at Children Hospital Complex and ICH, Multan during 2018. One hundred patients were selected for this study analysis. Demographic data collected at the time of study inclusion were age, body weight, height, body mass index (BMI), menstrual status, and age at menopause. **Result:** A total of 100 patients (mean age 34.6 years, range 22-49) were included in the study, 75 men (58.3%, mean age 37.1, range 24-49) and 25 women (41.7%, mean age 31.24, range 22-45). Average T score of the osteopaenic group is -1.41 (SD; 0.354). Prevalence of osteopaenia is seen more in people who are more than 50 years of age, females, and people with low BMI, people who are usually not exposed to sunlight and who are mostly bound to houses. **Conclusion:** It is concluded that decreased BMD is associated with increasing age, female gender, low BMI, little exposure to sun light and being restrained to homes.

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INTRODUCTION:

Osteoporosis is characterized by low bone mass and damaged structural integrity that lead to increased risk of bone fracture. Osteoporosis is defined as a systemic skeletal disorder in which low bone mass and deterioration of bone architecture occur. The reduced bone strength predisposes patients to an increased risk of fragility fractures and is likely to become an important cause of morbidity and mortality [1]. Decreased bone mineral density is the known cause of bone aches and predisposes bones to low energy fractures. Osteoporosis has become a world-wide health as well as economic problem. In Pakistan, 40 million people both male and females suffer from osteopaenia. This prevalence is expected to raise osteoporotic patients to 11.3 million in 2020 [2].

Vast numbers of factors affect the BMD. These include genetic, biologic, smoking habits, sun exposure, dietary habits, serum calcium and vitamin D3 levels, hormonal changes, pregnancy, physical activity, space travel etc. Ogur *et al.* concluded that carbonated drinks intake is significantly associated with decreased bone mineral density. Sowers *et al.* concluded that fetal demand in pregnancy has no negative effect on bone mineral density of mother. Cauley and associates while studying factors affecting BMD in older men, found that African American had better BMD as compared to Caucasians. Hip BMD declined and lumbar spine BMD increased with increasing age [3]. Use of antidepressants, coffee, family history of osteoporotic fractures, history of chronic lung disease, prostate cancer and kidney stones were also associated with low BMD. However, alcohol use, osteoarthritis, physical activity, grip strength, dietary calcium intake were related with increased BMD. Interestingly, smoking, caffeine, thiazide diuretics had no negative effect. It has been established that the old age, postmenopausal status, and low body mass index are the possible risk factors for osteoporosis in SLE [4]. Furthermore, chronic inflammation, immobility, and vitamin D deficiency due to lack of sun exposure and treatment with glucocorticoids may be common factors that substantially increase osteoporosis risk in these patients [5].

Aims and objectives

The basic aim of the study is to find those risk factors which are associated with decreased bone mineral density.

METHODOLOGY OF THE STUDY:

This study was conducted at Children Hospital Complex and ICH, Multan during 2018. One hundred patients were selected for this study analysis. Demographic data collected at the time of study inclusion were age, body weight, height, body mass index (BMI), menstrual status, and age at menopause. In addition, we inquired about lifestyle related data including smoking, intake of alcohol, history of lumbar or femoral head fracture, and family history of osteoporosis and fracture.

Measurement of bone mineral density

Their calcaneus bone mineral density was measured by using Sonost 3000-Ultrasound Bone Densitometer. T score was calculated and categorized into normal, osteopaenic and osteoporotic according to WHO guidelines.

Statistical analysis

Student's t-test was performed to evaluate the differences in roughness between groups. Two-way ANOVA was performed to study the contributions. A chi-square test was used to examine the difference in the distribution of the fracture modes (SPSS 19.0 for Windows, SPSS Inc., USA).

RESULTS:

A total of 100 patients (mean age 34.6 years, range 22-49) were included in the study, 75 men (58.3%, mean age 37.1, range 24-49) and 25 women (41.7%, mean age 31.24, range 22-45). Average T score of the osteopaenic group is -1.41 (SD; 0.354). Prevalence of osteopaenia is seen more in people who are more than 50 years of age, females, people with low BMI, people who are usually not exposed to sunlight and who are mostly bound to houses. Prevalence of osteopaenia is less common in younger age groups, males, obese, those who are exposed to sunlight daily, those who are not bound to houses and those who are smoker. No statistical significant difference was seen in women who carry three children or less as compared to women who have more than 3 children.

Table 01: Analysis of low bone mineral density and its association

Groups		Normal BMD (n=188)	Osteopaenic (n=107)	Osteoporotic (n=5)	Total (n=300)	Prevalence of osteopaenia	Prevalence Ratio	P-value
Age	< 30 years	70	32	1	103	31.07%		
	30-50 years	98	47	1	146	32.19%		
	>50 years	20	28	3	51	54.90%	1.78	< 0.05
Gender	Male	86	36	0	122	29.51%		
	Female	102	71	5	178	39.89%	1.35	< 0.05
Body Mass Index	Under weight	10	8	1	19	42.10%	1.43	< 0.05
	Normal weight	67	51	3	121	42.15%		
	Over weight	63	28	1	92	30.43%		
Daily milk intake	Obese	48	20	0	68	29.41%		
	Milk taker	66	38	3	107	35.51%		
	Not taker	122	69	2	193	35.75%	1.01	> 0.05
Parity of females	Three or less	62	44	4	110	40%		
	More than 3	40	27	1	68	39.70%	0.99	> 0.05
	Total	102	71	5	178			
Routine exposure to sunlight	Yes	76	31	0	107	28.97%		
	No	112	76	5	193	39.38%	1.36	< 0.05
Routine Cola drinking	Yes	110	58	0	168	32.52%		
	No	78	49	5	132	37.12%	1.07	> 0.05
Living habits	House bound	73	56	3	132	42.42%	1.40	< 0.05
	Not bound	115	51	2	168	36.36%		
Smoking habit	Smoker	24	10	0	34	29.41%		
	Non smoker	164	97	5	266	36.47%	1.24	> 0.05

DISCUSSION:

Although atherosclerosis and osteoporosis are considered to be different in pathology, they share bidirectional correlation. On the one hand, low bone density is associated with incident cardiovascular disease. On the other hand, women with cardiovascular disease have increased risk of osteoporotic fracture. In patients with SLE, decreased BMD is an independent predictor for premature coronary calcification [6]. The definite link between atherosclerosis and osteoporosis suggested that they may share common risk factors. Oxidized LDL is well known to play an important role in the generation and progression of atherosclerosis. So it may be considered as a candidate that links both disorders. In fact, it has been shown that high serum LDL-c level may be a risk factor for low BMD and for nonvertebral fragility fracture. Increased level of oxidized LDL-c was demonstrated in patients with active lupus and chronic systemic inflammation including dyslipidemia may contribute to the bone loss [7].

Increased prevalence of females osteopaenic patient is an established fact. Women start with lower bone density than their male peers and they lose bone mass more quickly as they age, which leads to osteoporosis in some women. This is consistent with not only

international studies but also national ones. Many studies suggested an inverse relationship between daily intake of milk and occurrence of osteoporosis [8]. We could not find any difference regarding prevalence of osteopaenia in people who take milk on daily basis than those who do not. Probably study sample was short and questionnaire did not elaborate the amount of milk daily taken.

This is a common understanding that number of children or parity of women affect the bone mineral density negatively [9]. This concept was refuted in our study as the prevalence ratio for women with 3 or less children was statistically insignificant than those with more than 3 kids. Heidari et al. concluded that Parity > 7 is linked with decreased BMD in younger postmenopausal women but it provides osteoprotective effect against age-related bone loss, which counteracts the early negative effect. Therefore, parity in aggregate is not a risk factor for postmenopausal osteoporosis [10].

CONCLUSION:

It is concluded that decreased BMD is associated with increasing age, female gender, low BMI, little exposure to sun light and being restrained to homes. It is not affected by daily milk intake, parity of females, cola drinking and smoking in our part of the

world.

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