ASSOCIATION BETWEEN BONE MINERAL DENSITY AND LOW BACKACHE IN POSTMENOPAUSAL WOMEN

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ABSTRACT

Objective: To determine association between bone mineral density (BMD) and low backache in post menopausal women in general population of Lahore.
Study Design: Descriptive study.
Place and Duration of Study: Gynaecological outpatint department of Punjab Rangers Hospital Lahore during the period, from Feb 2015 to Feb 2016.
Material and Methods: Screening for association between BMD and low backache in 481 post menopausal women was carried out. Low back pain was considered clinically relevant if the patient complained of moderate to severe pain, or if the patient needed any medical treatment. Their BMD was measured. The measurement site for BMD was the calcaneus of patient. The diagnosis was based on T score. Data was analyzed.
Result: Osteoporosis was found in 303 (88.3%) of 50-60 years age group and 40 (11.7%) of 61-plus years age group.
Conclusion: Bone mineral density was significantly lower in postmenopausal women and there was a strong association between low back ache and decreased BMD value.

Keywords: Backache, Bone mineral density, Osteoporosis, Screening.

INTRODUCTION

A fertile woman, achieve highest bone mineral density (BMD) around her reproductive years due to protection of female hormones. Amenorrhea, both primary and secondary with estrogen deficiency leading to osteoporosis a systemic disease of the bone[1]. The reason why the back pain is common among elderly women may be related to osteoporosis, especially in lower socioeconomic class.

Osteoporosis means porous bones. Porous bones develop when bones in body lose excessive quantity of their protein and mineral content, mainly calcium, as a result bone mass and bone strength gets decreased due to which bones become fragile[2]. Osteoporosis ultimately induces fractures of vertebra, hip and wrist for which postmenopausal women are more vulnerable.

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Chronic backache (CBA) in itself is not considered a disease yet it is a health problem that causes significant morbidity in terms of working-class. Patients seek repeated medical advice, which results in increased costs paid by patients in our country where system of medical and health insurance is still in its infancy[3]. It is anticipated that aging is proceeding more rapidly in future, so would increase post menopausal population of women. Both osteopenia and osteoporosis in post menopausal women can be attributed to low BMD during the growing period in, childhood, adolescence and young age or an rapid loss of bone density after reaching peak bone mass.

After menopause, 54% of females are considered to have osteopenia and 30% of them could develop osteoporosis in the future. Prevalence of osteoporosis increases with age, it can range from 5% in women of 50 years old to about 50% in women over 85 years. According to National Health and Nutrition Examination survey (NHANES III), an estimated 14 million

American women over the age of 50 years are affected by low bone density at the hip. In Latin America, the statistics are very similar, where it is estimated that 12%-18% of women over 50 years have osteoporosis of the spine and about 8%-22% of the hip. Osteoporosis was reported 39.1% of Korean women in postmenopausal age[4].

In this study, we used the definitions of osteoporosis established by the World Health Organization (WHO): Osteoporosis is observed if a T-score ≤ -2.5 standard deviations (SDs), which, in theory, means described as having osteopenia (T-score between -1 and -2.5 SDs) in any population[5]. Greater prevalence of osteoporosis diagnosed following menopause, as there is rapid decline of BMD in this age group[6]. The prevalence of osteoporosis increases with age for all sites, and according to WHO definition, up to 70% of women over the age of 80 years have osteoporosis.

This silently progressing metabolic bone disease is widely prevalent in India. According to expert groups the number of osteoporotic patients in India were approximately 26 million (2003 figures), with the numbers projected to increase upto 36 million by 2018[7]. Osteoporosis has numerous medical implications and huge economic impact. So it is of utmost importance that we take immediate steps to create awareness and treatment of this disease.

This study was aimed to determine the association of low BMD and low backache in a group of postmenopausal women of middle class families of our local population.

MATERIAL AND METHOD

This descriptive study was carried out in the Gynecological outpatient department of Rangers Hospital Lahore, during the period between February 2015 and February 2016. A total of 481 patients were selected by non probability consecutive sampling. All the patients underwent a detailed history, complete physical examination and relevant laboratory investigations. Only those patients were considered for the study, which fulfill the inclusion criteria. Mothers/ wives of the Rangers personal were included. Collecting accurate data for the exact date of onset for menopause was not possible, as patients were remembering an approximate month and time. A practical approach was to set an arbitrary cut off point of 50 years, which include maximum number of the postmenopausal women.

The exclusion criteria were those patients having a medical history known to affect bone metabolism. Those women were excluded who had endocrine abnormalities in the parathyroid and thyroid glands. Subjects with, diabetes, hypertension, renal disease, rheumatoid arthritis, sickle cell disease, and systemic lupus erythematosis were excluded. Subjects with a history of medication such as estrogen, corticosteroids and hormone replacement therapy were also excluded from the study.

Each patient was evaluated with a detail history and complete physical examination. Their anthropomorphic measurements such as weight, height, and body mass index (BMI) were also taken. Body weight was measured in kilogram (kg) on an electronic beam scale. Height was measured in centimeter (cm) using a stadiometer. BMI was calculated as weight (kg) divided by height square (m^2) categorized the patients according to the criteria by the WHO, normal weight, BMI <24.9 kg/m^2; overweight, 25<BMI <29.9 kg/m^2; obesity, BMI >30 kg/m^2.

Each patient then filled a survey proforma that evaluated demographic characteristics, reproductive history, and low back pain severity. In this study we used DXA SONOST 3000 in measurement of BMD, to produce T-scores. T-score were divided into normal group, osteopenia group and osteoporosis group (T>-1.0, -2.5, T<-1.0, and T<-2.5). The measurement site for BMD is the calcaneus of patient. It takes about one minute to measure the density and to display the shape of ultrasonic wave by computing simulation on monitor. The diagnosis is based on T score. The independent variables to be analyzed in the logistic regression model were BMI, weight; occupation, intake of milk cheese

and calcium. The independent variable analyzed in logistic regression method. Patients level of education and history of fracture as a result of slight trauma were these variables. Also BMD was evaluated for different age groups. The correlation between BMI and BMD was analyzed.

Data were analyzed by SPSS version 21. Mean and standard deviations were calculated for quantitative variables. Categorical variables were expressed as frequency and percentages. Independent t-test was applied for the comparison of continuous variables. Qualitative variables were compared by Chi square test. A *p*-value <0.05 was considered as significant. It was reviewed and approved by the ethical committee, and all appropriate cases were sent to specialists for treatment once diagnosed with disease.

RESULTS

Out of total 481 women the BMD test was positive in 343 patients. Table-I shows the effects of demographic characteristic of study population. Women were divided in two groups with respect to age during taking history and filling up the performa for study. One group was 50-60 years and second 61 and above years. Among 50-60 years old group, 134 (97.1%) were normal and osteoporosis was diagnosed in 303 (88.3%) cases. However 40 (11.7%) cases were diagnosed as osteoporosis positive in second group (61-above).

Education status of ladies was subdivided in three criteria. Uneducated patients were seventy in total. The women with eight standard were 312 in number.

In working ladies 33 (23.9%) were within the normal range and in non working 105 (76.1%) were normal. In socio-demographic risk factors it is revealed that the families with income less than 10,000 Rs/month, only 45 (13.1%) patient had positive report but with income within 10000 Rs-15000 Rs/month 184 (53.6%) women had osteoporosis and 37 (26.8%) normal.

Table-I: Demographic characteristics of study population.

Demographic Characteristic	Normal (138)	Osteoporosis (343) N(%)	*p*-value
Age (Years)			
50-60 years (437)	134 (97.1%)	303 (88.3%)	0.003
61-above (44)	4 (2.9%)	40 (11.7%)	
Education			
Uneducated	9 (6.5%)	61 (17.8%)	<0.001
Middle	127 (92%)	185 (63.9%)	
Intermediate	2 (1.4%)	97 (28.3%)	
Occupation			
Working	33 (23.9%)	78 (22.7%)	0.782
Non working	105 (76.1%)	265 (77.3%)	
Monthly Income			
<10,000	53 (38.4%)	45 (13.1%)	<0.001
10,000-15,000	37 (26.8%)	184 (53.6%)	
>15,000	48 (34.8%)	114 (33.2%)	

In table-II anthropometric values of women with low backache were studied. It reveals that age group of 50-60 have 93 (100%) patients were low backpain negative (LBP-) and 344 (88.7%) were low backpain position (LBP+).

The patients with LBP (-) had a mean height of 5.05 ± 0.33. The patients with LBP (+) had a mean height of 5.02 ± 0.25. The BMI of study population revealed that among the patients of low BMI <18.5kg/m^2, 85 (91.4%) were LBP (-).

The women of normal BMI=18.5-24.9 kg/m were seventy six. Among these LBP (-) were 28 (8.6%) and LBP (+) were 48 (12.4%). In overweight and high BMI there was no subject.

In table-III risk factors affecting the BMD was surveyed. Exposure to sunlight was available to 440 (91.5%) subjects but 332 (96.79%) women had osteoporosis.

Low Intake of calcium was present in 440 (91.5%) and among these 261 (76.1%) vs 190 (39.5%) have osteoporosis. The factors affecting the BMD and reaching the statistical significance (p<0.05) include low intake of calcium, low intake of cheese and yogurt. History of trauma or fracture was also important (p-value<0.145). None of patients had received estrogen therapy or corticosteroid for prolong duration.

DISCUSSION

This cross sectional study was carried out in middle class families of Rangers, personal attending Rangers Hospital Lahore, which is a tertiary care referral centre. This study is first of its kind to evaluate BMD and related clinical aspects in post menopausal women in this population.

In this study the values of BMD shows that it significantly deceases with increasing age, as in second group of age (61 and plus years) less compared to in first group of age (50-60 years). These results were similar to study of Japanese women in 2010 where BMD significantly diminished with increasing age in post menopausal women. Chinese medical association also mentioned, that by the age 70 years, it decreased by 30–40%[8].

Table-II: Anthropometric values of women with low backache.

Characteristic	Low Back Pain Negative LBP (-)	Low Back Pain Positive LBP(+)	*p*-value
Age			
50-60	93 (100%)	344 (88.7%)	<0.001
61 and above	0	44 (11.3%)	
Hight	5.05 ± 0.33	5.02 ± 0.25	0.372
Weight	68.43 ± 11.25	63.5 ± 13.02	0.001
BMI			
Low <18.5kg/m^2	85 (91.4%)	340(87.6%)	0.309
Normal=18.5-24.9kg/m^2	8 (8.6%)	48(12.4%)	
Over Weight			
25-29.9kg/m^2	0	0	
>30 kg/m^2	0	0	

Table-III: Risk factors surveyed.

Risk factors		Total (481)	Osteoporosis (343) N (%)	*p*-values
Exposure to sunlight	Yes	440 (91.5%)	322 (96.79%)	<0.001
	No	41 (8.5%)	21 (3.12%)	
	No	291 (60.5%)	208 (60.6%)	
Glass of milk	Yes	426 (88.6%)	303 (88.3%)	<0.001
	No	55 (7.4%)	40 (11.7%)	
Intake of cheese/ yogurt	Yes	115 (23.9%)	62 (18.1%)	<0.001
	No	366 (76.1%)	281 (81.9%)	
History of trauma/ fracture	Yes	256 (53.2%)	185 (53.9%)	0.145
	No	225 (46.8%)	158 (46.1%)	

In our study 303 (88.3%) women in the age bracket of 50-60 have osteoporosis. Same results are found in another study of Pakistan which shows that prevalence of osteoporosis is 55% in women aged 45-54 and 97% in women aged 75-84 years[9].

In our study the prevalence of low backache is 344 (88.7%) in 50-60 years age group and 44 (11.3%) in 60 above years group. Similar results are found in Mateusz et al in 2015 LBP is a massive problem in these women[10]. Same results were found by Jacobs et al in 2006, who under took a longitudinal study of 277 elderly subjects, finding that the prevalence of CBA increased from 44% to 58% at ages of 70 and 77 years.

Severity of CBA could be predicted by low BMD[11]. In our study positive correlation is found with body mass index, BMD and backache in postmenopausal women. Studies have shown that woman should achieve and maintain a healthy weight to maintain muscle mass, particularly guarding against underweight and overweight[12]. In our study results revealed that low back pain was more in women with low BMI. The same results are found out in a study carried out in Korea in 2014[13].

Education level of patients is strongly associated with socioeconomic status and this is reported in several studies. It is also found in our study that subject with less education, taking less, milk/cheese and calcium have lower level of BMD. It is because that factors such as low calcium intake, milk and milk product, and lack of physical activity in small houses with less exposure to sunlight are linked with socioeconomic strata of patients. This has been found in various studies that quality of life can improve BMD[14].

In Korean postmenopausal women it has been found that by treating them with calcium and milk and milk products and improving the life style can improved BMD[15]. Risk factor such as smoking by the husband did not show association, probably due to low prevalence and lower strength of association[16].

Osteoporosis is defined as condition of low bone mass which predisposes to fractures[17]. Family history of fractures, overweight, lack of physical activity, tobacco and alcohol use all may contribute to the risk of osteoporosis[18]. In our study the past history of fracture or trauma was present in 185 (53.9%) with a *p*-value of 0.145. Same is found in Spain, and most common form of osteoporotic fracture is vertebral with a prevalence, of 20%-30% in postmenopausal women over the age of 50 years[19].

CONCLUSION

Bone mineral density was significantly lower in postmenopausal women and there was a strong association between low back ache and decreased BMD value.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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