Original Research Article

Evaluation of Bone Mineral Density in Post-Menopausal Women: An Institutional Based Study

Bindulika Tyagi[1], Ashu Jain[2]*

[1]Assistant Professor, Department of Obstetrics & Gynaecology,
Rama Medical College Hospital & Research Centre, Hapur, Uttar Pradesh, India.
[2]Associate Professor, Department of Obstetrics & Gynaecology,
Venkateshwara Institute of Medical Sciences, Gajraula, Amroha, Uttar Pradesh, India.

ABSTRACT

Background: Osteoporosis is the major cause of fractures in the elderly. Bow bone mineral density (BMD) and poor nutrition have been identified as one of the risks for fractures. Postmenopausal women with greater body weight, mediated by lean body mass or fat body mass, have been reported to have both higher lumbar spine, hip and femoral neck BMD and lower rate of bone loss. Hence; the present study was undertaken for assessing the bone mineral density in postmenopausal women.

Materials & Methods: A total of 125 post-menopausal women were enrolled in the present study. Complete demographic details of all the patients were obtained. Clinical examination was done and information in relation to life-style, reproductive age and menstrual histories was also obtained. Bone mineral density (BMD) was assessed by DXA method. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi- square test was used for assessment of level of significance.

Results: Mean BMD among the patients of the present study was 0.69 g/cm^2. Mean BMD among the patients of age group of 45 to 55 years, 56 to 65 years and 66 to 75 years was found to be 0.76 g/cm^2, 0.68 g/cm^2 and 0.65 g/cm^2 respectively. While correlating the BMD among postmenopausal women divided on the basis of age, significant results were obtained.

Conclusion: Bone mineral density of postmenopausal women decreases significantly with age.

Key words: Bone Mineral Density, Postmenopausal, Women.

*Correspondence to:
Dr. Ashu Jain,
Associate Professor,
Department of Obstetrics & Gynaecology,
Venkateshwara Institute of Medical Sciences,
Gajraula, Amroha, Uttar Pradesh, India.

Access this article online	
Website: **www.ijmrp.com**	**Quick Response code**
DOI: **10.21276/ijmrp.2017.3.3.100**	

INTRODUCTION

Osteoporosis is the major cause of fractures in the elderly, accounting for about 1.5 million fractures a year that may increase mortality rate, reduce independence, and limit walking ability and activities of daily living thus seriously affecting quality of life in the later years. Multiple factors, in addition to low bone mineral density (BMD) and poor nutrition, have been identified as risks for fractures, including reduced lean and fat tissue, reduced levels of physical activity, general frailty, poor balance, and slowed gait speed.[1-3]

The amount of fat to lean body mass surrounding tissues could affect the tissue-density gradient assessed by DXA and influenced the accuracy and reproducibility of BMD measurements. Postmenopausal women with greater body weight, mediated by lean body mass or fat body mass, have been reported to have both higher lumbar spine, hip and femoral neck BMD and lower rate of bone loss.[4-6] Hence; the present study was undertaken for assessing the bone mineral density in postmenopausal women.

MATERIALS & METHODS

The present study was conducted in the Department of Obstetrics & Gynaecology, Rama Medical College Hospital & Research Centre, Pilkhuwa, Hapur, Uttar Pradesh (India) and it included assessment of bone mineral density in post-menopausal women. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. A total of 125 post-menopausal women were enrolled in the present study.

Inclusion Criteria

- Patients within the age group of 45 to 75 years,
- Patients with negative history of any other systemic illness,

- Patients who gave informed consent,
- Patients with negative history of any known drug allergy

Complete demographic details of all the patients were obtained. Clinical examination was done and information in relation to lifestyle, reproductive age and menstrual histories was also obtained.

Bone mineral density (BMD) was assessed by DXA method. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi- square test was used for assessment of level of significance.
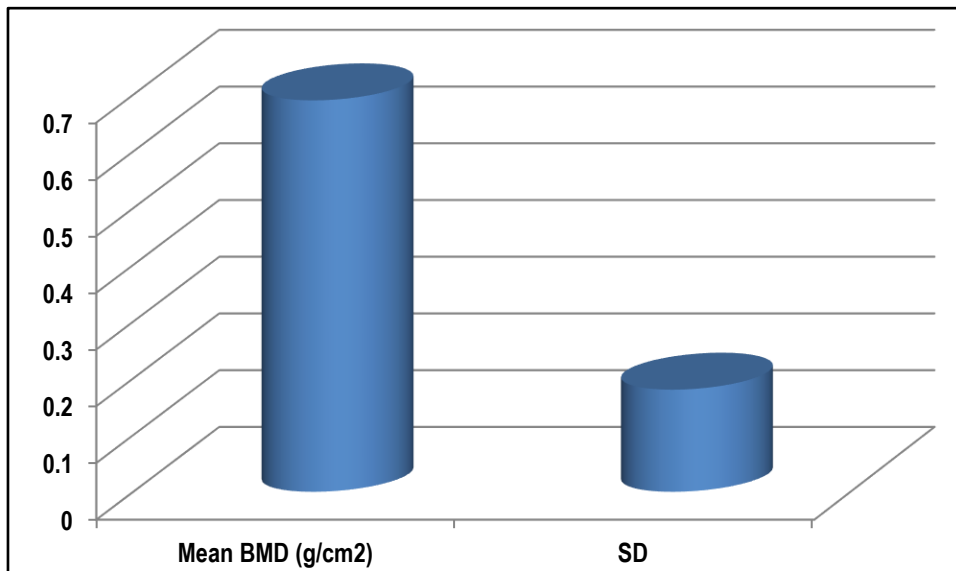
Table 1: Age-wise distribution

Age group (years)	Number of patients	Percentage
45 to 55	31	24.8
56 to 65	55	44
66 to 75	39	31.2

Table 2: Correlation of BMD with Age-wise distribution

Age group (years)	Mean BMD (g/cm^2)	SD
45 to 55	0.76	0.14
56 to 65	0.68	0.16
66 to 75	0.65	0.12
t-statistics	-1.812	
p- value	0.002 (Significant)	

Graph 1: Bone mineral density

Graph 2: Correlation of BMD with Age-wise distribution
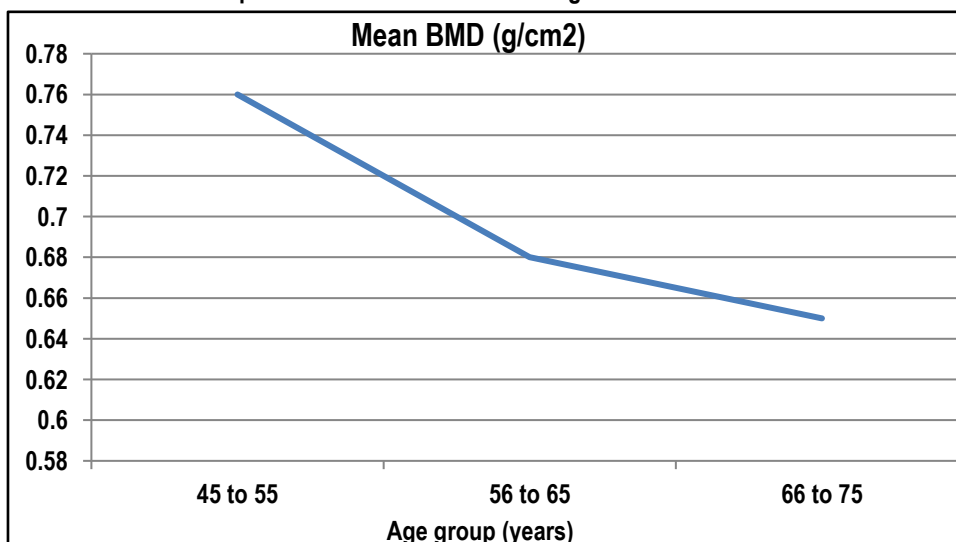
RESULTS

In the present study, a total of 125 postmenopausal women were analysed. Mean age of the subjects of the present study was 56.5 years. Majority of the subjects (44 percent) belonged to the age group of 55 to 65 years. 31.2 percent of the patients belonged to the age group of 66 to 75 years. Mean BMI of the patients was found to be 30.8 Kg/m^2. Mean BMD among the patients of the present study was 0.69 g/cm^2. In the present study, mean BMD among the patients of age group of 45 to 55 years, 56 to 65 years and 66 to 75 years was found to be 0.76 g/cm^2, 0.68 g/cm^2 and 0.65 g/cm^2 respectively. While correlating the BMD among postmenopausal women divided on the basis of age, significant results were obtained.

DISCUSSION

Since many risk factors for osteoporosis, such as diet, deficiency of trace minerals, reproductive factors, inactivity and tobacco use, are lifestyle variables related to social and cultural background, the influence of formal educational level on bone mineral density [BMD], together with establishment of a relationship between formal educational level and bone mineral density in postmenopausal women are the main areas of research in the current scenario.[6,7]

Different researchers have investigated step length and force production during walking and aging, but little has been done relating these aspects of gait to BMD in postmenopausal women. Some studies have shown balance and gait speed measures to be either unrelated or related only weakly to femoral BM.[8,9] Hence; the present study was undertaken for assessing the bone mineral density in postmenopausal women.

In the present study, a total of 125 postmenopausal women were analysed. Mean age of the subjects of the present study was 56.5 years. Majority of the subjects (44 percent) belonged to the age group of 55 to 65 years. 31.2 percent of the patients belonged to the age group of 66 to 75 years. Mean BMI of the patients was found to be 30.8 Kg/m^2. Mean BMD among the patients of the present study was 0.69 g/cm^2. Heidari B et al determined the relationship between BMD in the femoral neck (FN) and lumbar spine (LS) with some common clinical, demographic, and biochemical parameters in postmenopausal women. All postmenopausal women of the Amirkola Health and Ageing Project (AHAP) who performed bone densitometry were included. BMD at FN and LS was measured by DXA method. Data regarding clinical, demographic, and biochemical characteristics were provided. Osteoporosis (OP) was diagnosed by the International Society for Clinical Densitometry criteria. Five hundred thirty-seven women with mean age of 67.9 ± 6.7 years and mean menopause duration (MD) of 15.8 ± 5.1 years were studied. MD correlated negatively with FN-BMD and LS-BMD g/cm^2. Body mass index (BMI) correlated positively with FN and LS-BMD g/cm^2. The association of MD with risk of FN-OP was stronger than LS-OP. Obesity and metabolic syndrome (MS) and higher serum ferritin reduced the risk of OP at both LS and FN similarly, whereas the impacts of parity, prior fracture, high level of education, and physical activity were significantly different across BMD measurement sites. The results of their study indicated a significant association between OP and MD, obesity, parity, MS, history of fracture, serum ferritin, level of education, and physical activity.[10]

In the present study, mean BMD among the patients of age group of 45 to 55 years, 56 to 65 years and 66 to 75 years was found to be 0.76 g/cm^2, 0.68 g/cm^2 and 0.65 g/cm^2 respectively. While correlating the BMD among postmenopausal women divided on the basis of age, significant results were obtained. Heidari B et al, in another study, investigated the impact of multiple pregnancies on postmenopausal bone mineral density (BMD). BMD at the femoral neck (FN) and lumbar spine (LS) was measured by dual energy X-ray absorptiometry (DXA) method. Diagnosis of osteoporosis (OP) was confirmed by World Health Organization criteria. Women were stratified according to number of parity as < 3, 4-7, and > 7 parity groups as well as in age groups of < 65 and 65 in age groups of < 65 and > or = 65 years. BMD values and frequency of OP were compared across the groups according to age. A total of 264 women with mean age of 63 +/- 8.7 and mean menopausal duration of 15.8 +/- 10.2 years were studied. LS-OP and FN-OP were observed in 28% and 58.3% of women, respectively. There were significant differences in BMD values across different parity groups at both sites of LS and FN (p = 0.011 and p = 0.036, respectively). Parity 4-7 (vs. < or = 3) increased BMD nonsignificantly, but > 7 significantly decreased LS-BMD and FN-BMD as compared with 0-7 parity (p = 0.006 and p = 0.009, respectively). Parity > 7 increased the risk of LS-OP by OR = 1.81 (95% CI 1.03-3.1, p = 0.037) and FN-OP by OR = 1.67 (95% CI 0.97-2.8, p = 0.063). In addition, women with high parity had lower BMD decline at LS and FN by age (> or = 65 vs. < 65 years) by 1.3% (p = 0.77) and -10.1% (p = 0.009) as compared with 0-7 parity group by -9.5% (p = 0.001) and -15% (p = 0.0001), respectively. Parity > 7 is associated with spinal trabecular bone loss in younger postmenopausal women as well as an osteoprotective effect against age-related bone loss, which counteracts the early negative effect.[11]

CONCLUSION

From the above results, it can be concluded that bone mineral density of postmenopausal women decreases significantly with age. However; further studies are recommended.

REFERENCES

1. Tappurainen M, kröger H, Saarikoski S, Honkanen R, Alhava E: The effect of previous oral contraceptive use on bone mineral density in perimenopausal women. Osteoporosis Int. 1994, 4: 93-8.
2. Shargil AA. Hormone replacement therapy in perimenopausal women with a triphasic contraceptive compound: a three year prospective study. Int J Feril 1985; 30:15.
3. Lindsay R, Tohme J, Kanders B. The effect of oral contraceptive use on vertebral bone mass in pre- and post-menopausal women. Contraception. 1986;34:333-40.
4. O'Nell TW. Back pain, disability, and radiographic vertebral fractures in European women: a prospective study. Osteoporosis International. 2004; 15:760–5.
5. Shea S, Stein AD, Basch CE, Lantigua R, Maylahn C, Strogatz DS, Novick L: Independent associations of educational attainment and ethnicity with behavioral risk factors for cardiovascular disease. Am J Epidemiol. 1991, 134: 567-82.
6. Fujivara S. Fracture prediction from bone mineral density in Japanese men and women. Journal of Bone and Mineral Research. 2003; 18:1547–53.

7. Sinclar HK, Bond CM, Taylor RJ: Hormone replacement therapy: a study of women's knowledge and attitudes. Br J Gen Pract. 1993, 43: 365-70.

8. Stevenson J, Lees B, Davenport M, Cust MP, Ganger KF. Determinants of bone density in normal women: risk factors for future osteoporosis. Br Med J. 1989;298: 924-8.

9. Laitinen K, Valimaki M, Keto P. Bone mineral density measured by dual-energy x-ray absorptiometry in healthy Finnish women. Calcif Tissue Int. 1991;48:224- 31.

10. Heidari B, Hosseini R, Javadian Y, Bijani A, Sateri MH, Nouroddini HG. Factors affecting bone mineral density in postmenopausal women. Arch Osteoporos. 2015;10:15. doi: 10.1007/s11657-015-0217-4. Epub 2015 May 14.

11. Heidari B, Heidari P, Nourooddini HG, Hajian-Tilaki KO. Relationship between parity and bone mass in postmenopausal women according to number of parities and age. J Reprod Med. 2013 Sep-Oct;58(9-10):389-94.