



## Comparison between body mass index and bone mineral density among rural and urban postmenopausal women

Harbans Kaur

Assistant Professor, B.Z.S.F.S Khalsa Girls College, Morinda, Punjab, India

### Abstract

The aim of this study is to evaluate between body mass index and bone mineral density among rural and urban postmenopausal women. Setting and Participants: In this comparative study 500 postmenopausal women in the age group of 45-60 years were randomly selected from rural and urban area (250 in each group) of Punjab, India. Rural subjects were selected from Majal Khurd region which is located in Patiala district. Urban subjects were selected from Patiala region, Punjab. All the subjects were recorded and BMI was calculated. BMD was measured in calcaneus (heel bone) using Furuno's CM-200 light ultrasound bone densitometer. The correlations between the variables were calculated by Pearson correlation test. P value < 0.05 was considered significant. Positive correlation was observed between BMI and BMD among urban samples whereas negative correlation was observed between BMI and BMD among rural samples BMI was found to be significantly associated with BMD in both rural and urban postmenopausal women. Body Mass Index (BMI) was found to be significantly associated with BMD. BMI is an important determinant of BMD in Indian females.

**Keywords:** mineral density, rural, women, postmenopausal

### Introduction

Osteoporosis is a public health problem worldwide and is a common disease in the older population, especially in the postmenopausal women (Srivastava *et al.*, 2002) [8]. This disease is characterized by low bone mass and destruction of bone tissue, leading to increased fracture risk. Prospective studies by (Ravn *et al.*, 1999 and Bjarnason 2000) [1, 6] indicates that early postmenopausal women who have low BMI lose more bone compared to those with higher BMI tertiles. Measurement of body mass index is an inexpensive and valuable technique to guide public health policy, clinical decisions, and evaluation of nutritional status (Mahan LK *et al.*, 2012) [5]. Bone mineral density (BMD) test measures the density of minerals present in the bones using a special scan. Quantitative ultrasound (QUS) measurement could be an ideal tool to screen for osteoporosis at the community level (Kim *et al.*, 2001) [4]. The present study was conducted to assess the association between BMI and status of BMD among rural and urban postmenopausal women.

### Materials and Methods

Quantitative approach was adopted for this Comparative study. The study was conducted in rural Majal Khurd village in District of Punjab, India. Around six villages are nearby Majal Khurd. Urban Patiala is a locality in the northern region of the Punjab state, India. Free medical camps for women were organized in both the areas on Saturdays and Sundays

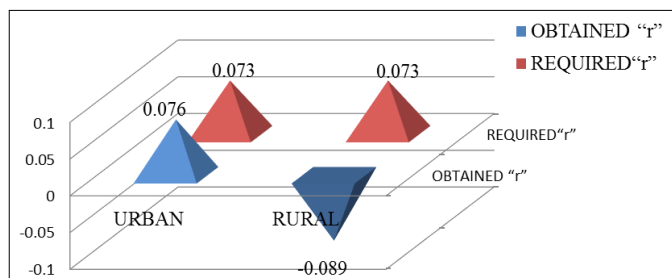
for a period of one month in each area. About 398 women in rural area and 431 women in urban area attended the camp among them 500 postmenopausal women age between 45-60 years were selected from rural and urban area (250 from each group) by random sampling method. The independent variables included rural and urban postmenopausal women, and the dependent variable included BMI and BMD (bone mineral density). Inclusion criteria for the sample selection comprises of postmenopausal women age between 45-60 years. With the brief introduction of the study, informed consent was obtained from all the study participants. BMD was measured in calcaneus (heel bone) using Furuno's CM-200 light ultrasound bone densitometer. A single technician performed all QUS measurement to minimize subjective error. BMD values were measured in terms of QUS device specific T-score criteria which is similar to WHO's criteria. (Kanis *et al.*, 1994) [3]. T-score is the number of standard deviation relative to the standard speed of sound (SOS) value of the young age group. • Normal is a T-score of -1.0 or higher • Osteopenia is defined as between -1.0 and -2.5 • Osteoporosis is defined as -2.5 or lower. BMI was calculated by dividing weight in kilograms by the square of the height in meters as in the equation: weight (kilograms) /height (meters)<sup>2</sup> (Sahu, *et al* 2007) [7]. The standard categorisation of BMI by Centre for disease control indicates less than 18.5 as Underweight, 18.5-24.9 as Normal, 25.0-29.9 as overweight, and 30.0 and above as obese.

**Table 1:** Correlation coefficient between bone mineral density and body mass index among rural and urban postmenopausal women.

| S. No | Correlation between variables | Correlation between variables | Obtained “r” | Required “r” |
|-------|-------------------------------|-------------------------------|--------------|--------------|
| 1     | Urban BMI                     | Urban BMD                     | 0.076        | 0.073        |
| 2     | Rural BMI                     | Rural BMD                     | -0.089       | 0.073        |

\*significant at 0.05 level of confidence.

Table & figure 1 shows the Correlation Coefficient between Bone mineral density and body mass index among Rural and Urban Postmenopausal Women. The above table & figures shows the correlation coefficient (“r”) between Bone mineral density (BMD) and Body mass index (BMI) among rural and urban postmenopausal women. The Obtained r value between Bone mineral density and Body mass index among urban subjects was 0.076. This value was higher than the table value of 0.073 at 0.05 level of confidence, hence it was significant. Among rural subjects obtained r value between BMI and BMD was -0.089. This Obtained r value between BMI and BMD value was also higher (without considering – ve sign) than the required r value of 0.073 at 0.05 level of confidence, hence it was also significant. Positive correlation was observed between BMI and BMD among urban postmenopausal women whereas rural subjects showed negative correlation.



**Fig 1:** Correlation coefficient between bone mineral density and body mass index among rural and urban postmenopausal women.

**Conclusion**

This Comparative study between body mass index and bone mineral density among rural and urban postmenopausal women indicated Positive correlation between BMI and BMD among urban samples whereas negative correlation was observed between BMI and BMD among rural samples BMI was found to be significantly associated with BMD in both rural and urban postmenopausal women. It was concluded that BMD was influenced by BMI. The quality of life will be better in urban than the rural postmenopausal women. The body mass index will be lower in rural than in urban postmenopausal women due to level of activities and nutritional habits (Kaur *et al.*, 2015) [2] BMI is an important predictors of BMD, affecting bone loss. Therefore, it is recommended to assess BMD and BMI with a larger number of patients.

**References**

1. Bjarnason NH, Christiansen C. The influence of thinness and smoking on bone loss and response to hormone replacement therapy in early postmenopausal women. *Journal of Clinical Endocrinology and Metabolism*. 2000; 85(2):590-596.

2. Kaur R, Sharma VL, Singh A. Prevalence of knee osteoarthritis and its correlation in women of rural and urban parts of Hoshiarpur (Punjab) J Postgrad Med Edu Research. 2015; 49(1):32-36.
3. Kanis JA. Assessment of fracture risk and its application to screening for postmenopausal osteoporosis: synopsis of a WHO report. WHO Study Group. *Osteoporos Int*. 1994; 4:368-81.
4. Kim KI, Han IK, Kim H. How reliable is the ultrasound densitometer for community screening to diagnose osteoporosis in spine, femur, and forearm? *J Clin Densitom*. 2001; 4:159-65.
5. Mahan LK, Escott-Stump S. Raymond JL, Krause MV. *Krause's Food & the Nutrition Care Process*. 13 ed. US: Elsevier/Saunders. 2012.
6. Ravn P, Cizza G, Bjarnason NH. Low body mass index in early postmenopausal women. Early Postmenopausal Intervention Cohort (EPIC) study group. *Journal of Bone and Mineral Research*. 1999; 14:1622-1627.
7. Sahu MT, Agarwal A, Das V, Pandey A. impact of maternal body mass index on obstetric outcome. *Journal of obstetrics and gynaecology research*. 2007; 33(5):655-659.
8. Srivastava M, Deal C. Osteoporosis in elderly: prevention and treatment. *Clin Geriatr Med*. 2002; 18(3):529-55.