Osteoporosis and Risk of Fracture amongst Women with Different Ethnicity: An Institutional Based Study

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Abstract
Background: *Osteoporotic fractures are one of the major health burden imposed on significant world's population these days. Outcome of such fracture cases is very deleterious, often resulting in significant loss of quality of life. In the field of osteoporosis, special attention has been paid in the recent past in relation to the factors that affect the bone strength. Hence; we planned the present study to assess the prevalence of low bone mineral density (BMD) and its association with fracture incidence among postmenopausal women from different ethnic groups.*
Materials & Methods: *The present research included assessment of prevalence of low bone mineral density (BMD) and its association with fracture incidence among postmenopausal women from different ethnic groups. A pre-framed set of questionnaire was given to all the subjects in the starting of the study. A total of 100 subjects were included in the present study. Among these 100 subjects, 50 subjects were of white ethnic origin and remaining 50 subjects were of Asian ethnic origin. Complete details amount the demographic data and risk factors was obtained in all the subjects from the self-administered questionnaire. Single X-ray absorptiometry was used for assessment of bone mineral density (BMD) in all the subjects. All the results were recorded and analyzed by SPSS software.*
Results: *Significant results were obtained while comparing the BMI distribution of subjects in between the two study groups. Significant difference was obtained while comparing the history of fracture since 45 in between the two study groups. Relative risk of fracture in White ethnic subjects was 0.96 (95% CI), while in the Asian subjects, the relative risk was found to be 0.58 (95% CI).*
Conclusion: In between the different ethnic groups, there is significant difference in relation to the incidence of low BMD and the risk of fracture at any given BMD.
Keywords: *Ethnicity, Osteoporosis, Women.*

Introduction

Osteoporotic fractures are one of the major health burden imposed on significant world's population these days. Outcome of such fracture cases is very deleterious, often resulting in significant loss of quality of life. For establishment of adequate

treatment of protocols, it is necessary to understand the pathophysiology of osteoporotic fractures. One of the crucial factors affecting the incidence of occurrence of osteoporosis is ethnicity and race.[1, 2] Different ethnicity and races have different risk factors and functional treatment outcome among osteoporotic patients. Understanding ethnic and racial influences on osteoporotic fractures is critical to decreasing the burden of such fractures on patients and society.[3,4]

In the field of osteoporosis, special attention has been paid in the recent past in relation to the factors that affect the bone strength. As with other chronic diseases, however, the pathogenesis is not simple, nor have all avenues been adequately characterized.[5- 7]

Hence; we planned the present study to assess the prevalence of low bone mineral density (BMD) and its association with fracture incidence among postmenopausal women from different ethnic groups.

Materials & methods

The present research was carried out in the department of Orthopaedics and Obstetrics & Gynaecology of American International Institute of Medical sciences, Udaipur, Rajasthan and R.N.T. Medical College, Udaipur, Rajasthan, India. It involved assessment of prevalence of low bone mineral density (BMD) and its association with fracture incidence among postmenopausal women from different ethnic groups. Written consent was obtained from all the subjects before the starting of the study after explaining in detail the entire research protocol. Inclusion criteria for the present study included:

- Women with a minimum of one year past their last menstrual period,
- Women above 48 years of age,
- Women with negative history of intake of any bone metabolism altering drugs

A pre-framed set of questionnaire was given to all the subjects in the starting of the study. A total of 100 subjects were included in the present study. Among these 100 subjects, 50 subjects were of white ethnic origin and remaining 50 subjects were of Asian ethnic origin. Complete details amount the demographic data and risk factors was obtained in all the subjects from the self-administered questionnaire. Ethnicity was self-reported in all the subjects included in the present study. Investigation of the risk factors included weight; body mass index (BMI); personal and family history of fracture; maternal history of osteoporosis etc. Single X-ray absorptiometry was used for assessment of bone mineral density (BMD) in all the subjects. All the results were recorded and analyzed by SPSS software. Chi-square test was used for evaluation of level of significance. P- value of less than 0.05 was taken as significant.

Results

Out of total 100 subjects included in the present study, 50 subjects belonged to white ethnic origin while the remaining 50 belonged to Asian ethnic origin. Mean age of subjects of While and Asian origin was found to be 51.5 years and 50.4 years respectively. Significant results were obtained while comparing the BMI distribution of subjects in between the two study groups. In 6 and 3 subjects of White and Asian group respectively, there was positive history of fractures since after 45 years of age. Significant difference was obtained while comparing the history of fracture since 45 in between the two study groups. Relative risk of fracture in White ethnic subjects was 0.96 (95% CI), while in the Asian subjects, the relative risk was found to be 0.58 (95% CI).

Table 1: Details of patients of both the study groups

Parameter		White	Asian	Overall	P- value
Number of subjects		50	50	100	-
Mean age (years)		51.5	50.4	52.75	0.50
Body mass index (n)	0- 22.9	12	25	37	0.02*
	23- 25.99	12	10	22	
	26- 29.99	14	12	26	
	30 and above	12	3	15	
History of fracture since 45		6	3	9	0.01*

*: Significant

Graph 1: BMI among subjects of both the study groups
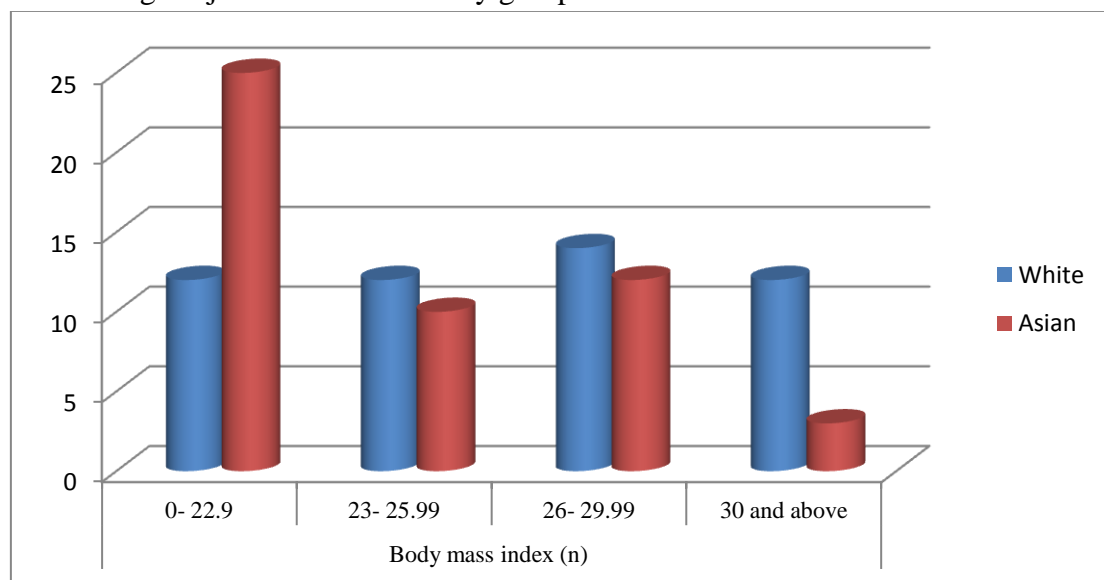
Table 2: Relative risk of fracture by ethnicity

Ethnicity	Osteoporotic fractures (95% CI)
White	0.96
Asian	0.58

Discussion

In the present study, significant difference was obtained while comparing the history of fracture since 45 in between the two study groups. Relative risk of fracture in White ethnic subjects was 0.96 (95% CI), while in the Asian subjects, the relative risk was found to be 0.58 (95% CI). In one of the previous study conducted by Shin MH et al, authors assessed the correlation of race/ethnic and geographic differences in bone mineral density (BMD) by fracture history in men aged 65 and older. The datasets included the Osteoporotic Fractures in Men (MrOS) Study, MrOS Hong Kong, Tobago Bone Health Study, Namwon Study, and Dong-gu Study. The 2 Korean cohorts were combined. There was a significant race/ethnic interaction for lumbar spine BMD by fracture status, which was driven by the small number of Hispanic men. There was no interaction for femoral neck or total hip BMD.

Low BMD was associated with a higher prevalence of fracture in all cohorts and the magnitude of the BMD differences by fracture status was similar across groups suggesting homogeneity in the BMD-fracture relationship among older men.[8]Cauley JA reviewed current literature related to the influence of ethnicity and race on the epidemiology and prevalence of fracture. They selectively reviewed the current literature in relation to osteoporosis, ethnicity, and race. Ethnicity and race, like sex, influence the epidemiology of fractures, with highest fracture rates in white women. Bone mineral density is higher in African Americans; however, these women are more likely to die after hip fracture, have longer hospital stays, and are less likely to be ambulatory at discharge. Consistent risk factors

for fracture across ethnicity include older age, lower bone mineral density, previous history of fracture, and history of two or more falls. Ethnic and racial disparities exist in the screening, diagnosis, and treatment of osteoporosis. Across ethnic and racial groups, more women experience fractures than the combined number of women who experience breast cancer, myocardial infarction, and coronary death in 1 year.[9]Barrett-Connor E et al assessed the prevalence of osteoporosis and the correlation between BMD and fracture in women from five ethnic groups. Heel, forearm, or finger BMD was measured, and risk factor information was obtained; 82% were followed for 1 year for new fractures. BMD and fracture rates were compared, adjusting for differences in covariates. By age 80, more than one-fifth of women in each ethnic group had peripheral BMD T scores <-2.5. Black women had the highest BMD; Asian women had the lowest. Only the BMD differences for blacks were not explained by differences in weight. After 1 year, 2414 new fractures of the spine, hip, forearm, wrist, or rib were reported. BMD at each site predicted fractures equally well within each ethnic group. Ethnic differences in BMD are strongly influenced by body weight; fracture risk is strongly influenced by BMD in each group.[10]In one of the previous studies in the National Osteoporosis Risk Assessment (NORA) conducted by Siris ES et al studied, authors compared the incidence of occurrence of low bone mass among women of 50-64 years of age and women with > or =65 of age. They also evaluated the association of bone mass with the occurrence of fractures in these women. They enrolled a total of 200160 postmenopausal women with age of equal to or more than 50 years with negative prior diagnosis of osteoporosis. In the heel, forearm and the finger region, they evaluated the baseline BMD values. Low bone mass was observed in 31 percent of the women of age group of 50 to 64 years, in comparison to the 62 percent of women with age above 65 years. Under the light of obtained results, they concluded that

approximately similar one year relative risk existed in between postmenopausal women of both the age groups in relation to the low BMD.[11]

Conclusion

From the above obtained data, the authors conclude that in between the different ethnic groups, there is significant difference in relation to the incidence of low BMD and the risk of fracture at any given BMD. However; further studies are recommended.

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