Short Communication (SS-I)

A CONCUSSION ON BONE HEALTH: UNHEALTHY FOOD HABITS

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ABSTRACT

The present study is a comparison of good food habits and poor or unhealthy food habits of premenopausal women folk of Durg district of Chhattisgarh region of India, hailing from middle socio economic status (MSES). This has revealed an important fact that apart from various factors such as physical activities, genetics, hormonal imbalances, medication and some physical ailments which become a reason for immobility, maintaining a balanced dietary regime, institutes itself as a prime factor with reference to bone density. Bone mineral density of the subjects was tested by the calcaneal bone densitometer. A schedule to enquire about food habits including quantity and type of food and their frequency for the past one month was filled by the respondents. The obtained scores on food habits questionnaire was tabulated and median±S.D. was used to bifurcate cases into good and poor food habits. A pretested questionnaire based on scores was used to find out Socio-economic status which included educational status, type of job, resources in possession, stature, number of kids, economic status etc. This interpretation is made on the basis of bone mineral density classification in which scores indicate presence of bone disease such as osteopenia or osteoporosis.

Key Words: Bone Mineral Density (BMD), Osteoporosis, Osteopenia, Bone densitometer

INTRODUCTION

Bones give structure to the body, help in moving and protecting our internal organs. Bones are made up of complex mixture of minerals (calcium, phosphate, magnesium) and various kinds of collagen and non-collagen proteins. Bone is a living tissue that changes constantly; the old bones are removed and replaced by new ones.¹⁴ Osteoporosis is characterized by low bone mass with micro architectural deterioration of bone tissue leading to enhanced bone fragility. This increases the susceptibility to fracture. Osteoporosis is a silent disease, reflected only in a low bone density, till a fracture occurs.⁵ Risk factors for osteoporosis include aging, being female, low body weight, low sex hormones such as during menopause, smoking and medication. The bone mineral density (BMD) is tested to determine the bone loss at an early stage.⁶⁹ Studies have provided evidence that weight in infancy is a determinant of bone mass in adulthood.¹⁰ Childhood and adolescence are particularly valuable times to improve bone mass through good nutrition and exercise.¹¹ Peak bone mass is typically achieved by late adolescence. The stronger a person's bones are at this time, the better the person is able to deal with resorption (loss) of bone that occurs with aging.¹² Nutrition plays a major role in the development and maintenance of bone structures resistant to usual mechanical loadings. In addition to calcium in the presence of an adequate vitamin D supply, proteins represent a key nutrient for bone health, and thereby in the prevention of osteoporosis.¹³ Bone-healthy diets should include adequate amounts of protein, plenty of vegetables and fruits, minimal amounts of sodium , and sufficient calcium and vitamin D.¹⁴ A study revealed that hypo energetic diets higher in dairy foods, dietary calcium, and protein with daily exercise, favorably affected important bone health biomarkers vs. diets with less of these bone-supporting nutrients.¹⁵

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In a study it was seen that the root cause of low BMD ratio was lower intake of nutrients. It was observed that the total mineral and vitamin intake required for bone health (vitamin D, calcium, magnesium, phosphorus and) was below the recommended intake, among majority of the sample. Even the problem was not really age related but in majority of the sample it was due to sedentary life style and lack of awareness about the importance of exercise in relation to bone health. Estrogen is a female hormone that plays an important role in the health of women. One of its benefits is that it protects bones and helps keep them strong and healthy. When estrogen levels drop, many women lose bone density. As a result, their bones may not be as strong. For midlife women, the drop in estrogen that happens with menopause can lead to rapid bone loss. Hypothesis
Significant difference will be observed in the BMD of the female subjects following healthy dietary regime and the subjects with poor dietary habits.

**MATERIAL AND METHODS**

The present study is an outcome of a comprehensive assessment of Bone Mineral Density of premenopausal women populace of district Durg, Chhattisgarh, India. The study was conducted in the year 2012 and 2013. Sample comprised different categories of normal and healthy women based on socio-economic status, religion and communities with different food habits. More than 400 subjects were selected randomly from the twin cities (Durg and Bhilai) and study was focused to middle socio-economic status with a view to reach common population at large.

A questionnaire/schedule was administered to all the examinees to explore their Socio-economic Status which included type of residence, educational status, family income, possession of household articles, number of dependent family members, type of job, number of kids and their educational status etc. Based on their scores the subjects were classified as LSES, MSES and HSES Middle SES is selected for the present study. A schedule to enquire about Food Habits including quantity and type of food and their frequency for the past one month was administered. For determination of food habits, mean ±1/2S.D. was used. Scores on food habits questionnaire lying above this were considered as good food habits while scores below mean ±1/2S.D. were considered as poor food habits. Apart from these general life style schedule was also included which comprised details such as exposure to sun on per day basis, stature, consumption of alcohol, smoking, aerated drinks, consumption of cocoa etc. which show indirect impact on bone density.

**Bone Density :** Bone Mass Density of the subjects was tested by the calcaneal bone densitometer. This apparatus helps in screening the subjects who suffer from major bone related problems silently. Osteoporosis is a frailty disease which shows no symptoms before a fracture. This apparatus is portable, cost effective and noninvasive. Hence easy to reach a large population.

In a comparative study by McCauley et al, patients with a heel T-score of above -1.2 are very likely to have normal bone density on axial densitometry, whilst patients with heel T-score of below -2.2 are very likely to have osteoporosis at the hip or spine. Patients whose measurements lie between the thresholds should be referred for axial DXA. (McCauley E1, Mackie A, Elliott D, Chuck A., Heel bone densitometer: device specific thresholds for the assessment of osteoporosis.

BMD was measured by calculating T-score. It is the difference, in standard deviations, between BMD of the patient, from the mean BMD of a young adult reference population (healthy 30 year old adult population). A T-Score between +1 and -1 is considered normal. A T-Score less than -1.0 but higher than -2.5 indicates low bone mass density (Osteopenia), and a T-Score of -2.5 or less indicates Osteoporosis. The greater the negative number, the more severe the osteoporosis as per the norms provided by WHO.

**RESULTS AND DISCUSSION**

A perusal of Table 1 indicates that the bone mineral density status of women with poor food habit was found to be significantly less than women subjects having good food habits. This interpretation is made on the basis of bone mineral density classification in which scores below in Fig. 1, Fig. 2 and Table 2 indicate presence of bone disease such as osteopenia.
Table 1: Effect of food habits on bone density

<table>
<thead>
<tr>
<th>Groups</th>
<th>n</th>
<th>Mean±S.D.</th>
<th>‘t’</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good Food Habits</td>
<td>100</td>
<td>-1.30±0.94</td>
<td>6.97</td>
<td>.01</td>
</tr>
<tr>
<td>Poor Food Habits</td>
<td>100</td>
<td>-1.95±0.66</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fig. 1: Graphical representation of mean scores on bone density among women of MSES

![Graphical representation of mean scores on bone density among women of MSES](image)

Fig. 2: Graphical representation of comparing good nutrition and poor nutrition

![Graphical representation of comparing good nutrition and poor nutrition](image)

Table 2: Status of BMD in the selected subjects

<table>
<thead>
<tr>
<th>Types</th>
<th>Normal BMD</th>
<th>Osteopenia</th>
<th>Osteoporosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good Nutrition</td>
<td>73%</td>
<td>22%</td>
<td>05%</td>
</tr>
<tr>
<td>Poor Nutrition</td>
<td>38%</td>
<td>47%</td>
<td>15%</td>
</tr>
</tbody>
</table>

CONCLUSION

The results obtained specially amongst the women subjects belonging to MSES were found to be alarming. The intake of Protein and Calcium found to be very less as compared to the normal values prescribed by ICMR (Indian Council of Medical Research) for Indians. Lack of awareness about the balanced diet and role of physical activity were found to be prime causes. Women folk, in general are hardworking but do not enjoy the freedom of decision making. Dairy products are not consumed as per the requirements, sometimes
because of the financial reasons or ignorance. Overall 73% and 38% of the subjects were found within the normal range of BMD, 22% and 48% under Osteopenia and 5% and 15% subjects were found to be Osteoporotic amongst Good Food Habit and Poor Food Habit categories respectively.

REFERENCES