

Research Paper :

Role of dietary intake and calcium supplementation on serum calcium levels and bone mineral density of osteoporotic women

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ABSTRACT

One hundred twenty women of 45-55 years of age belonging to middle income group were selected on the basis of their Bone Mineral Density (BMD). They were equally divided into two groups of 60 each. Assessment of nutritional status was done by dietary survey before and after the study period. Dietary survey revealed that among the subjects of group I, daily intake of milk and milk products, roots and tubers, GLVs, other vegetables and fruits increased significantly whereas the intake of sugar and jaggery and fats and oils decreased significantly after NC. Among the subjects of group II, intake of other vegetables and fruits increased and of sugar and jaggery and fats and oils decreased significantly. In group I, there was significant increase in the intake of beta - carotene, niacin, vitamin c, iron, calcium and phosphorus after NC. In group II the intake of protein, niacin and iron increased significantly. The serum calcium level of subjects of group I and II improved significantly. The t-score of the BMD value also increased significantly. The subjects were classified as osteopenic and osteoporotic on the basis of their t-scores. 66.7% and 33.3% of the subjects of group I and II, respectively were osteopenic and the rest were osteoporotic. But after NC the percentage of osteopenic subjects increased to 80 per cent in group I and 82 per cent in group II and the percentage of osteoporotic subjects decreased from 33.3 to 20 per cent in group I and 46.7 to 18.3 per cent in group II. Intake of calcium was positively and significantly ($p < 0.05$) correlated with BMD. On the other hand protein intake had negative and non – significant correlation with BMD of the subjects.

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Calcium is a major cation of bone-mineral. Its rate of deposition is highest in new born infant, decreasing to a very low level till the time people have stopped growing. The rate of calcium removal from skeleton tends to parallel the calcium deposition rate.

In the adult skeleton, most metabolic activity occurs by the process of bone 'remodeling' or bone turnover. This metabolic activity serves to maintain the structure and homeostatic functions of the skeleton.

In the long term, a change in bone mineral content reflects an imbalance between the processes of bone formation and resorption. Incomplete refilling of resorption cavities will result in a net loss of bone, and overfilling of these cavities will result in a net gain of bone.

After the age of 35-45 years, bone calcium mass decreases, gradually in men and abruptly in women for about a decade after their menopause. Menopause is a reproductive milestone in a woman's life. It brings a woman acutely face to face with reality of ageing when menstrual activity decreases and eventually ceases and body decreases production of female hormones-estrogen and progesterone. The term comes from the Greek words- 'Mena' and 'Paus' meaning 'Month' and 'Pause'

(Susan, 2001). The menopause accelerates age related bone loss.

Post menopausal osteoporosis is a very common problem characterized by low bone mass micro architectural deterioration of bone tissue leading to enhanced bone fragility and consequently increasing the fracture risk among elderly people (Dempster and Lindsay, 1993). However, osteoporosis is the sub-clinical or symptomless condition and becomes clinically evident only when a person suffers a fracture. Women have a greater bone loss than men especially after the onset of menopause due to hormonal changes and reduced absorption efficiency of calcium. Added to the uncontrollable factors such as age, sex and menopause, several controllable factors also affect osteoporosis which can be classified under different categories like physiological (menarche, early menopause, multiparity), lifestyle (inactivity and excessive exercise), nutritional (prolonged low calcium intake, high animal protein), medical factors (degenerative diseases as anorexia nervosa, diabetes, alterations in gastrointestinal functions etc.) and drugs (thyroid replacement drugs, glucocorticoid drugs, anticonvulsant drugs etc.) (Deepti *et al.*, 2006).