

# **National Seminar on Importance of Nutrition for Bone Health**

## **Conclusions and Recommendations**

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The “National Seminar on Importance of Nutrition for Bone Health” was sponsored by International Life Sciences Institute – India (ILSI-India) and ILSI Research Foundation in association with the Indian Academy of Pediatrics (Sub-Specialty Chapter on Nutrition) and the Indian Society for Bone and Mineral Research, at Hotel Le Meridian, New Delhi on April 20, 2006. More than 80 delegates participated in the Conference.

### **PREAMBLE**

The main components of bones are calcium and phosphorus, apart from other nutrients like protein, magnesium, copper, zinc, vitamin B, vitamin K etc. in a balanced manner. About 99 per cent of the calcium in the body is in bones though calcium is also required by other organs.

Childhood and adolescence is the time when bones are beginning to be modeled until around the age of 30 when peak bone mass is achieved. Thereafter rate of bone depletion exceeds rate of bone formation, the rate of decline being higher in post menopausal women due to fall in estrogen levels.

Diet in the modeling phase is extremely important. A critical element that helps absorb deposition of dietary calcium into bone mass is vitamin D. Deficiency of vitamin D is one of the major contributory factor responsible for lower bone mineral density ( BMD). Most studies in India reveal significant vitamin D deficiency among all sections of population. BMD is significantly lower in Indians compared to the Caucasians.

After the modeling phase is over, in middle age architectural deterioration of the bone structure begins. Bones become less dense and therefore more prone to osteoporotic fractures. The most common bones that are affected are hip bone, spine and wrist.

Osteoporosis is a global problem. Genetic factors also play an important part. Apart from the normal aging process leading to bone loss, osteoporosis can be induced by other causes like endocrine diseases, drugs, etc. Osteoporosis is both preventable and treatable though it is better prevented than treated.

A related bone problem is flurosis. It is prevalent in 17 States and has affected 66 million people including about 6 million children below the age of 14. It results from consuming ground water with excessive fluoride leading to bone disorders.

Though there are no comprehensive surveys about BMD, available data indicate that inadequate exposure of body surface area to direct sunshine, clothing pattern, relatively pigmented skin, environmental pollution, faulty housing architecture which does not allow enough sunshine, poor diet and lack of required food fortification, are among the major factors responsible for compromised bone health.

## **KEY MESSAGES**

- **There is not enough attention paid to bone health. Maintaining high bone density is critical particularly in old age though attention to bone health right from early childhood is important.**
- **Physical activity at all ages , particularly weight bearing activity, is important for bone health. It also reduces the risk of falling by strengthening muscles and maintaining balance.**
- **Calcium is critical for sound bone health. Foods containing calcium like milk, leafy green vegetables, etc. should be a part of the normal daily diet.**
- **Vitamin. D helps absorption of calcium. The main source of vitamin D is exposure to sunlight. Exposure of legs and arms to sunlight for about 25 minutes between 9 AM and 4 PM is adequate. Hence, for school going girls it is preferable to have skirts rather than salwar and for boys shorts rather than trousers.**
- **To a large extent bone mass modeling is governed by genetic factors. But a healthy life style with dual strategy consisting of good nutrition and adequate physical activity can correct the effect of genetic factors that influence BMD.**
- **Post menopausal women suffer greater bone loss than men due to lower levels of estrogen. Post menopausal women are more prone to osteoporosis particularly during peri-menopausal period and 5 years after menopause. They should prevent loss in the BMD through compensatory measures.**
- **Smoking and excessive alcohol reduce BMD and hence should be avoided.**
- **Calcium and Vitamin D supplementation during pregnancy is important to prevent bone loss.**
- **Prevention and control of flurosis is possible , first, by withdrawing the source of fluoride and, second, by intake of calcium, iron, vitamin C & E and other antioxidants which enable the body to undertake repair and maintenance of the damaged cells, tissues and organs.**

## **FRAMEWORK FOR ACTION: NATIONAL PLAN ON BONE HEALTH**

**A National Action Plan needs to be formulated involving all stakeholders to undertake consistent steps to promote bone health as a public health measure. Such a coordinated effort should involve relevant agencies like the Government, Industry, Research Institutions and Family Welfare Organizations. The following steps are critical in such a National Plan.**

- ◆ **Families should educate themselves on the importance of bone health and Recognize the need for good nutrition, exposure to sunlight and physical activity. Research Institutions should generate the relevant information in non-technical language.**
- ◆ **Anganwadi workers and primary health workers should be given additional training so as to be able to give attention to bone health among children and women.**
- ◆ **Schools should promote physical activity and emphasize during educational programs the importance of calcium and vitamin. D. The role of teachers in this endeavor is particularly important**
- ◆ **School dresses should be designed in a manner that exposes legs and arms to sunshine.**
- ◆ **Outdoor physical activity should be undertaken during after 9 AM and before 4 PM for exposure to sunshine for 10-15 minutes.**
- ◆ **Pharma industry should develop and promote appropriate supplements to make up for calcium and vitamin D deficiencies and innovate diagnostic and treatment.**
- ◆ **Food processing industry should fortify foods with calcium and vitamin D.**
- ◆ **State Government should take steps to improve quality of water in States where the fluoride content in water is high. Also calcium, iron and vitamin C & E supplements should be provided to make minimize the impact of flurosis.**
- ◆ **Normative data on bone density in Indians should be created for various age groups to define osteoporosis and osteopenia.**
- ◆ **The Central Government should fund research organizations to undertake a national survey on bone health and related issues.**
- ◆ **The Ministry of Health at the Centre should initiate a public awareness program through the media conveying the key messages.**