

## OSTEOPOROSIS in India

**Objective of report:** to understand Osteoporosis – bone disease.

: elementary knowledge for High School students

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**Report approved by** Orthopaedic Surgeon Dr Rajesh Maniar of Breach Candy Hospital , Mumbai

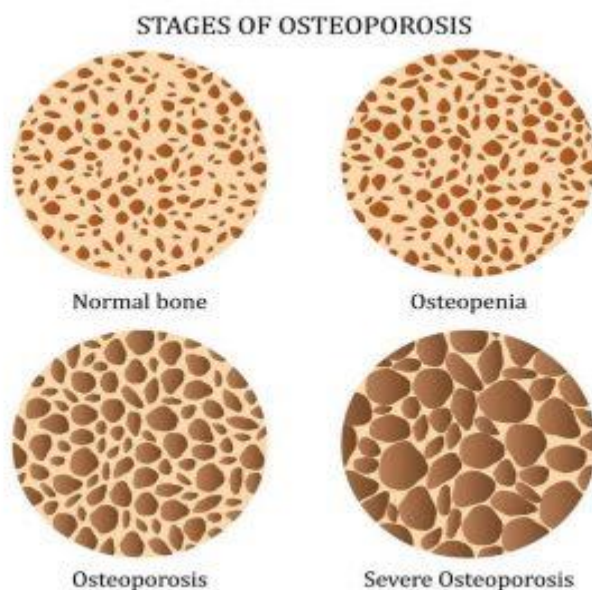
### Brief Introduction:

Osteoporosis is a bone disease. It causes the bones to become weak and brittle silently over a number of years. The density of a bone is measured through BMD T-score, or Bone Mineral Density.

As per World Health Organization (WHO), condition of bone is categorized as follows:

Osteoporosis = BMD T-score of  $<-2.5$  standard deviation (SD)

Osteopenia = BMD T-score of  $-1.0$  to  $-2.5$  SD



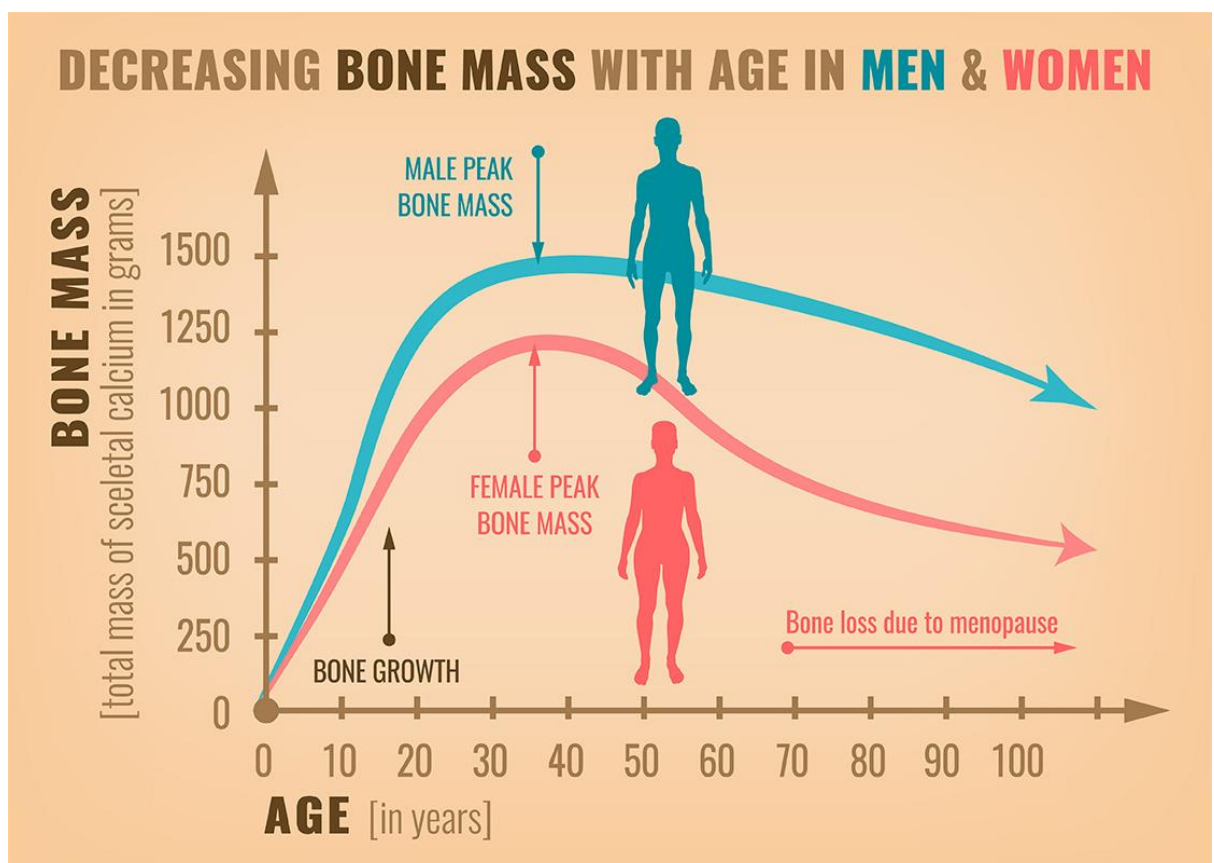
## WHO Criteria for Osteoporosis using BMD (Bone Marrow Density)

### Classification according to T-Score value:

- Normal: greater than -1.0
- Osteopenia: -1.0 to -2.5
- Osteoporosis: less than -2.5
- Severe or established osteoporosis: less than -2.5 plus history of fragility fractures

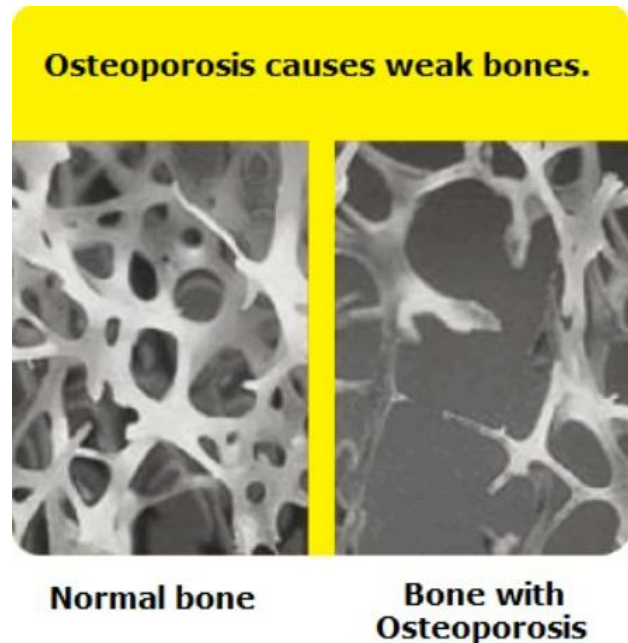
### Quick Facts:

- Nearly 200 million people suffer from osteoporosis each year.
- Osteoporosis is higher in women than men
- Tendency for Osteoporosis is higher in elderly than young adults.
- In India , it is estimated that more than 6 crore people suffer from this disease, out of which 80% are women
- Various studies have revealed an Osteoporosis prevalence in Indian women ranging from 8% to 62%
- According to WHO , 30% of postmenopausal women suffer from Osteoporosis



## Symptoms:

There are no symptoms in the early stages of Osteoporosis. Many times, people will have fracture before learning they have the disease



Even though Osteoporosis doesn't directly cause symptoms, one might notice a few changes in the body that can mean that the bones are losing strength or density. These warning signs of Osteoporosis can include :

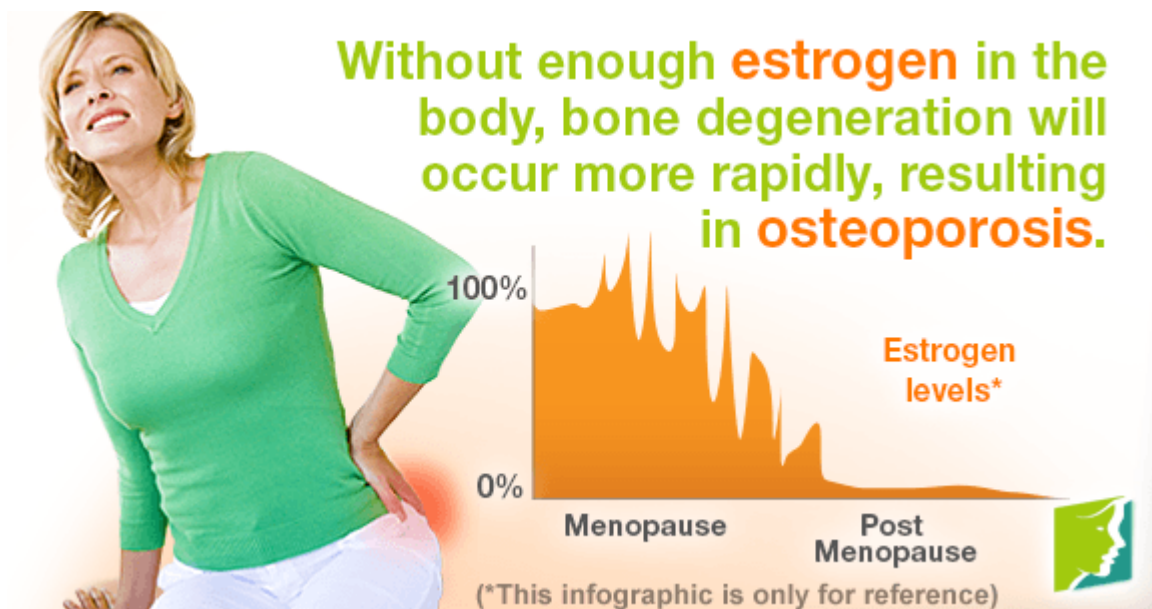
- Losing an inch or more of your height
- Changes in natural posture- stooping or bending forward
- Shortness of breath- due to compression of spine
- Lower back pain due pain in lumber spine

## Causes:

Factors that may increase your risk for osteoporosis include:

- **Sex.** Your chances of developing osteoporosis are greater if you are a woman. Women have lower peak bone mass and smaller bones than men. However, men are still at risk, especially after the age of 70.
- **Age.** As you age, bone loss happens more quickly, and new bone growth is slower. Over time, your bones can weaken and your risk for osteoporosis increases.
- **Body size.** Slender, thin-boned women and men are at greater risk to develop osteoporosis because they have less bone to lose compared to larger boned women and men.
- **Race.** White and Asian women are at highest risk. African American and Mexican American women have a lower risk. White men are at higher risk than African American and Mexican American men.
- **Family history.** Researchers are finding that your risk for osteoporosis and fractures may increase if one of your parents has a history of osteoporosis or hip fracture.
- **Changes to hormones.** Low levels of certain hormones can increase your chances of developing osteoporosis. For example:
  - Low estrogen levels in women after menopause.
  - Low levels of estrogen from the abnormal absence of menstrual periods in premenopausal women due to hormone disorders or extreme levels of physical activity.
  - Low levels of testosterone in men. Men with conditions that cause low testosterone are at risk for osteoporosis. However, the gradual decrease of testosterone with aging is probably not a major reason for loss of bone.
- **Diet.** Beginning in childhood and into old age, a diet low in calcium and vitamin D can increase your risk for osteoporosis and fractures. Excessive dieting or poor protein intake may increase your risk for bone loss and osteoporosis.
- **Other medical conditions.** Some medical conditions that you may be able to treat or manage can increase the risk of osteoporosis, such as other endocrine and hormonal diseases, gastrointestinal diseases, rheumatoid arthritis, certain types of cancer, HIV/AIDS, and anorexia nervosa.
- **Medications.** Long-term use of certain medications may make you more likely to develop bone loss and osteoporosis, such as:

- Glucocorticoids and adrenocorticotrophic hormone, which treat various conditions, such as asthma and rheumatoid arthritis.
- Antiepileptic medicines, which treat seizures and other neurological disorders.
- Cancer medications, which use hormones to treat breast and prostate cancer.
- Proton pump inhibitors, which lower stomach acid.
- Selective serotonin reuptake inhibitors, which treat depression and anxiety.
- Thiazolidinediones, which treat type II diabetes.
- **Lifestyle.** A healthy lifestyle can be important for keeping bones strong. Factors that contribute to bone loss include:
  - Low levels of physical activity and prolonged periods of inactivity can contribute to an increased rate of bone loss. They also leave you in poor physical condition, which can increase your risk of falling and breaking a bone.
  - Chronic heavy drinking of alcohol is a significant risk factor for osteoporosis.
  - Studies indicate that smoking is a risk factor for osteoporosis and fracture. Researchers are still studying if the impact of smoking on bone health is from tobacco use alone or if people who smoke have more risk factors for osteoporosis.



## Prevention and Care

- Nutrition: Diet that includes calcium , Vitamin D and protein are a must to ward off Osteoporosis
- Such intake can be in the form of liquids or solid foods
- Healthy lifestyle: healthy lifestyle is necessary for maintaining bone health
- Avoidance of smoking and alcohol
- Exercise can assist in maintain healthy bones
- People with osteoporosis should avoid high-impact exercise.

## Treatment / Management

Management of osteoporosis in women could be approached with two aspects, namely lifestyle modifications, and pharmacological therapy. The recommended guidelines are based on fracture risk assessment, comorbidities, and any history of fragility fractures.

### Non-Pharmacological Therapy

- **Smoking cessation** is strongly recommended, as smoking has been strongly associated with bone loss.
- Routine exercise of about 30 minutes per day three to four times a week is recommended and shown to improve Bone Mineral density (BMD).
- One of the mainstays of treatment of osteoporosis is an adequate dietary intake of calcium and vitamin D. If a woman is not getting about 1200 mg of calcium per day in regular diet intake, she should be supplemented with daily calcium or encouraged to eat calcium-rich foods.
- Calcium is available mainly in dairy products, including milk, cheese yogurt, etc. Calcium supplementation dose is usually 500 mg to 1000 mg per day in single or divided doses. Along with calcium, Vitamin D supplements are also very essential typically given in the form of Vitamin D3 ranging from 400 IU to 800 IU per day, but various dosing regimens are available based on the patient's vitamin D levels and other risk factors.

- Another important aspect of the management of osteoporosis is fall prevention. All patients at risk should be educated and provided adequate help to prevent falls and subsequent fractures.

**Pharmacological Therapy:** After replacing and supplementing adequate calcium and vitamin D, specific medications for osteoporosis could be initiated based on fracture risk assessment using FRAX as suggested by WHO.

As per the National Osteoporosis Foundation (NOF) guidelines, pharmacological therapy is initiated in any of the three scenarios:

1. Patient with a history of hip or a vertebral fracture
2. T-score less than or equal to -2.5 at femoral neck or spine
3. T-score between -1 and -2.5 with a 10-year probability of more than 3 percent hip fracture or more than 20 percent probability of osteoporosis-related major fracture.

### **First-line Therapy**

Bisphosphonates are still considered to be the first-line treatment of osteoporosis, which ranges from oral to intravenous use, the commonest ones include Alendronic acid, Risedronate, Etidronate, Ibandronate, Pamidronate, and Zoledronate.

- The most commonly used oral bisphosphonates dosed 70 mg once weekly and Risedronate 35 mg weekly.
- Multiple regimens ranging from daily to monthly dosing are available, but most patients prefer to take oral bisphosphonates once-weekly dosing.
- Oral bisphosphonates should be taken on an empty stomach at least half-hour before the first meal of the day with at least 8 oz of water to prevent the pills from getting stuck in the esophagus.
- Zoledronic acid is given intravenous route 5 mg either once yearly or once in two years.
- For women who remain at high risk of fractures should continue therapy for a maximum of ten years.

## Surgical Treatment

In a few patients where the pharmacological treatment has not been helpful, especially in at-risk vertebral fractures, well-known procedures from orthopedics can be helpful for stabilization of fractures and pain relief as well. The two commonest one used is

- **Kyphoplasty:** Balloon is inflated and introduced surgically, and then after the approximation of fractured bone pieces, a material to harden and stabilize the bone is introduced.
- **Vertebroplasty:** This involves inserting low viscosity cement material directly into the collapsed vertebral body for unstable fractures, to prevent further deformities and loss of height. It is different from kyphoplasty as it does not involve any manipulation of fractured bone pieces before injecting.

## Data showing prevalence of Osteoporosis in India:

Source: *International Journal of Research in Orthopaedics Babhulkar S et al. Int J Res Orthop. 2021 Mar; 7(2):362-368 <http://www.ijoro.org>*

BMD	Adult males (n=12325)	Elderly males (n=4040)	Adult females (n=11491)	Elderly females (n=3382)
Normal	4501 (36.50)	822 (20.34)	4070 (35.40)	536 (15.80)
Osteopenia	6356 (51.60)	1857 (46.00)	5922 (51.50)	1460 (43.20)
Osteoporosis	1468 (11.90)	1361 (33.60)	1499 (13.10)	1386 (41.00)

## Data Inference

Prevalence of Osteoporosis can be seen more among elderly.

Adult and Elderly females are more likely to suffer from Osteoporosis than men.

## Conclusion:

More than 6 crore people in India suffer from Osteoporosis, out of which 80% are women because of their postmenopausal hormonal changes. This should not be ignored, as it hampers our daily activities.

There is an imperative need to spread awareness among elderly and women about bone health, with regards to prevention and care.



**Disclaimer:**

*This information is prepared by Samika Jain, in the capacity of a high school student of Dhirubhai Ambani International School, Mumbai. This memorandum is based on information available to the public and data sources have been sighted wherever required. No representation is made that it is accurate or complete.*

*This memorandum is not an official medical prescription to health requirements. Patients should consult their own medical advisors before acting upon it. I do not undertake to advise and update anyone of changes in the opinion or information hereafter. The above view is only for educational purposes and by no means should I be held responsible for any adversarial outcomes.*

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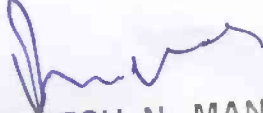
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