

Review Article**OSTEOPOROSIS - AN IGNORED AND SILENT BONE DISORDER IN INDIAN WOMEN**

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**ABSTRACT**

*Osteoporosis is a silently appearing, multifactorial, metabolic condition of bone in India. Most of the Indian women are having symptoms of osteoporosis like less bone mass, corrosion of bone micro-architecture. These symptoms collectively results in fracture. Osteoporotic fractures are foremost cause of mortality and morbidity in Indian women. Women susceptibility towards osteoporosis is thrice more than that of men. Now days it has become a health challenge for India. The burden increased by this disease is yet not quantified because limited availability of the data. Major contributors of this disease in India are sex inequity, long life, menopause before time, genetic polymorphism, poor diagnostic facilities, diet with less calcium and vitamin D etc. Drugs used as first line treatment are bisphosphonate, vitamin D and calcium. Choice of other drugs depends upon its availability, costing to the patient. The choice of other drugs in India needs more evaluation. With review I found that early diagnosis, advance diagnostic technique, awareness, patient education and proper management can leads to reduction the burden by osteoporosis. More research needed in above said areas.*

**Key words:** Osteoporosis, India, Epidemiology, Post- menopausal condition.

**INTRODUCTION**

About fifty percent of the world population is constituted by women. But with respect to status in society, they are always compromised. Men are getting more privileges than women in all respect. In western culture it is quite different; women are treated equally with respect to men. If we will have a look on Indian population, we will find unequal sex ratio. Even they are not given right to walk and work equally like men [1].

A time was there when women were supposed to be like goddess. Now we are running in the 21<sup>st</sup> century where women in India are not getting the position of goddess instead treated as slaves. They are deprived from their education, status and health. From these situations, Women empowerment concept developed. This cell gives women equality like men in all respect.

In India still the standard of this cell depend on location, standard of education, social aspects, age etc. The cell is present at national, state, and ground level of education, employment, participation in politics, health, equality in

property etc. But still practical situation is far from what it must be.

Being as a pharmacy professional, we reviewed the status of prevalence, diagnosis and treatment of Osteoporosis in Indian women. Osteoporosis is a silent metabolic disease having feature of low value of bone mass and disorganization in the architecture of bone, ultimately leading to increase in fragility and fracture of bones. Fractures may occur in association with pain, disability, suffering and even death of the subject. Osteoporosis is an asymptomatic disease [2].

Number of people of age group more than 60 has increased. The expected life of an individual in India is currently about 67 years. This value is expected that will rise to 71 upto 2025 and further upto 2050 it will be around 77 years. Nearly 10 percent of the total population of India belongs to an age group of more than 50 years. This is also expected to be increased upto 34 percent upto 2050. This will leads to hike in the number of person with Osteoporosis [3].

As we know that vitamin D is important to maintain bone health. Insufficiency of vitamin D has been found in all age in India, even India is having full exposure to sun light. Because of social and cultural reason, women are less exposed to sunlight. Even their diet provides only about 1% of total required amount of vitamin D. It was also reported that Asian are having higher activity of hydroxylase enzyme. These all constitute a condition called Hypovitaminosis D [4].

Calcium made its reservoir in bone upto 30 years. The deposition of calcium in bone depends upon nutritional intake

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and exercise. After the age of 30, there is progressive loss of bone during the entire life and is accelerated in menopausal stage of women. In India most of the people are vegetarian. Their diet contains oxalate and phytates which decrease calcium absorption<sup>4</sup>. It is found that postmenopausal women, pregnant lady, lactating women, adolescent have low ingestion of calcium<sup>5, 6</sup>. So, it is critical to achieve maximum bone mass while pubertal life. It is difficult for lower income group people to afford milk and product developed from milk<sup>7</sup>. In view of healthy bone of lactating and pregnant women, government of India provide 500 milligram of calcium per day by giving prepared food<sup>8</sup>.

Dual energy X-ray absorptometric (DEXA) technique is the best one for the diagnosis of Osteoporosis. But its availability in India is very poor. Even a single DEXA is not available for 1 million of people in India. Government hospitals are also having limited DEXA instruments. This is the reason why clinical practitioners are not able to diagnose and treat Osteoporosis. Illiteracy of women against osteoporosis and bone health also play an important role to make osteoporosis, an ignored disease of India<sup>9</sup>.

### EPIDEMIOLOGY

More than 230 millions of people are over 50 year age group and 20% of them are patient of Osteoporosis. Several studies were conducted to find the prevalence of osteoporosis. All of them suggest that fracture is the leading cause in osteoporotic patient.

In the year 2010 at Jahangir hospital Pune a study was conducted to estimate bone mineral density of 172 women having age range from 40 years to 75 years. 80 women were at the stage of premenopausal and 92 were at the stage of post menopausal. DEXA was applied for diagnosis. All patients were attending a routine checkup. It was reported that 48% of postmenopausal and 43% of premenopausal patient were suffering from lumbar spine osteopenia and 26% of postmenopausal and 8 % of premenopausal were suffering from lumbar spin osteoporosis. 62% of postmenopausal and 46% of premenopausal was reported with femoral neck osteopenia. 9% of postmenopausal women were reported with femoral osteoporosis<sup>10</sup>.

In the year 2011, a study was conducted at Chandigarh with the aim to find the prevalence of osteoporosis and its risk factor in pre and postmenopausal women. 200 subjects were included in this study. DEXA was used for the diagnosis. It was reported that 53% of the total subjects were suffering from lumbar osteopenia and osteoporosis<sup>11</sup>.

In the year 2011, a study was conducted on healthy population of age more than 50 years. 1600 healthy volunteers were participated in this study. There were 792 male and 808 women. DEXA was used as diagnostic method. It was found that 45% of women were suffering from osteopenia and 43% were suffering from osteoporosis<sup>12</sup>.

In the year 2013, a study was conducted on 158 women to find the prevalence of osteoporosis. Calcaneal ultrasonography was used for diagnosis. It was reported that 48 % were osteopenic and 13% were osteoporotic patient<sup>13</sup>.

In the year 2015, a study was conducted at Acharya vinobha bhavne rural hospital, wardha. Ultrasound technique

was used to measure bone density. There were 3532 female subject of age more than 30 years participated in this study. It was reported that 36% were suffering from osteopenia and 32% were reported with osteoporosis. The study suggested that socioeconomic and emotional support should be considered while management<sup>14</sup>.

In the year 2016, a study was conducted at MNR medical college, Telangana. Bone density was measured by using ultrasound technique. 940 subjects were included in this study. in this study 60% women were found normal and 40% were reported with low mineral density in bone. Among this 40%, 26% were reported osteopenia and 14% were suffering from osteoporosis. They also reported a direct relation of increasing age with the susceptibility toward osteoporosis. Study suggested that bone density was affected by exercise, extent of menopause, height, literacy, and age<sup>15</sup>.

In 2016, a study was conducted at tertiary health care centre situated in Trivandrum. It was conducted for a time period of 12 months. 400 subjects were included in this study. All of them were in the age group between 40 years to 60 years. Ultrasound technique was applied for estimation of bone density. The study reported about 18% patient with osteoporosis and 42% with osteopenia. The study also reported a proportionate relation between age and osteoporosis<sup>16</sup>.

In 2016, Das and his team conducted a study in west bangal to have a look on the incidence of osteoporosis. For their study they selected 1206 women between age group of nineteen to sixty five years. Measurement of density of bone was done by using quantitative ultrasound technique. They found that about 63% of the patients were suffering from osteopenia and about 11% were reported with osteoporosis<sup>17</sup>.

In 2017, a study was conducted by Abirami and his team in kanchipuram district of Tamil nadu with the same aim. A total of 130 women of middle aged were included in this study. Densitometer was employed as a tool to measure bone density. It was reported that around 28% women were suffering from osteoporosis and about 51 were reported with osteopenia<sup>18</sup>.

In 2017, a study was conducted at Apollo hospital, New Delhi. It was conducted to find osteoporotic incidence in urban Indians. 445 individuals were included in this study. Out of 445, 222 individuals were female. All individuals were more than 38 years old. Diagnostic procedure was conducted by using ultrasound technique. 9% were reported with osteoporosis and 60% were reported with osteopenia<sup>19</sup>.

In the year 2018, a study was conducted on 524 Indian at Max hospital, New Delhi. 42% female were their out of 524 individuals. DEXA was used to measure BMD. 7% were reported with osteoporosis. Out of this 11% were female and 4 % were male. 34% were found with osteopenia, out of this 40% were female and 30% were male<sup>20</sup>.

In 2018, a study was conducted at Jahangir medical research institute, pune. The aim was to understand prevalence as well as the relation of age with the bone loss. The study was conducted on 421 healthy people including both male and female (228). DXA was adopted for the diagnosis. The result reveals that postmenopausal women found more susceptible towards osteoporosis. Upto the age of 50, women were losing most of the bone health<sup>21</sup>.

A study was conducted in 2019, at three district of telangana. In this study 521 healthy person were included. DEXA and ultrasound technique was adopted for the diagnosis. In this study about 11% women reported with osteoporosis and 74% with osteopenia. In men prevalence of osteoporosis was about 6% and osteopenia was reported in 79%. Overall the prevalence was about 8% with osteoporosis and about 77% with osteopenia. So, they concluded with higher prevalence rate of osteoporosis in south Indian population [22].

So, data from the above studies suggest that, women are almost three times more susceptible to osteoporosis than men<sup>17</sup>. That to women over 70 years is mostly suffering with osteoporosis. Life expectancy is increasing in India. It is expected that it would be around 71 years by 2025. From all the above study we found a direct relation between age and osteoporosis. So, it is expected that osteoporosis can be a major bone disease. Exact data of prevalence is yet not available. Lacking of awareness and urbanization in India has a synergistic effect on the prevalence of osteoporosis. In 2013, the expected percentage of osteoporotic patient in India was 10% of the total population of age group 50 year and also broadcasted that it will be upto 34% by 2050 [5].

Exact data are also not available for the fracture prevalence<sup>23</sup>. Most of the clinical practitioners suggest that hip fracture is most common among the osteoporotic women. The ratio of prevalence among men and women are found varying because men are preferentially availing the hospital facility with respect women [2]. But it is true that osteoporosis is a common public health issue in India.

#### **Important factors that Potentiate Osteoporosis in India:**

Various factors has been found, which enhances the osteoporotic condition in the Indian women. These factors are categorized into 2 groups.

##### ***Non-modifiable factors:***

It includes advancement in the age, ethnicity, sex and genetical aspect. The body frameworks of women are generally smaller than men. They are having less calcium rich diet and also because of the Indian culture exposed less to the sunlight. In women estrogen play an important role in maintaining the health of bone. Indian women are getting less experience of estrogen while their life span. The reason for it is earlier menopausal condition. Thus estrogen got consideration as a significant threat for osteoporotic women. For all the above mentioned studies we found a positive relation between age and osteoporosis.

Genetics and ethnicity also influence peak bone content of Indian women. Polymorphisms of vitamin D receptor's gene also produce ethnicity. Polymorphism has also reported in the gene of estrogen receptor. Both these polymorphism has an strong impact toward osteoporosis in post menopausal women [24, 25].

##### ***Modifiable factors:***

It includes nutritional status and factors, life style, medication history and fracture history. Now a day's people of India are not adapting their own culture. Their mind set is that, it is making them backward with respect to other world. So, most of the Indian family adopt urban culture. This urbanization makes them sedentary, avoiding their exposure to sunlight, physically less active. Physical activities make muscles and bone healthy and also improve the body balance. But Indian people

especially women usually avoid it, thus they are at the side of lower bone density.

Most of the Indian women who are in elder age group are suffering from hypogonadism, cushing syndrome, sever liver and kidney problems, anorexia nervosa, thyrotoxicosis etc or they are taking medications like anticonvulsant, glucocorticoid etc. These all are responsible for the secondary osteoporosis. Use of glucocorticoid has positive relation with the occurrence of osteoporosis [2].

Bones are made up of hydroxyapatite crystal form of calcium, which provide stiffness to the bone. There are basic 2 sources of calcium, dairy and non dairy sources. Calcium obtained from dairy sources has good bioavailability than non dairy. It is reported from various study that Indian women diet is not fulfilling the daily calcium requirement. Next to this is less consumption of dairy product by Indian women. Indian foods are rich phytates content which basically delays the absorption of calcium [26]. All these constitute a lower bone density of Indian women.

India is abundant of sunshine. Sunlight is the best requirement for the synthesis of Vitamin D in skin. Despite the accessibility to sunlight, many of the data reported high rate vitamin D deficiency in Indian women. Deficiency is reported in all groups of Indian women like pregnant, postmenopausal, elder women etc [5, 6]. The deficiency may be due to less contact with sun light, traditional dresses, inadequate intake of food, vitamin deficient food etc. Deficiency of vitamin D retard absorption of calcium from gut. Poor nutrition condition also increases the prevalence rate of osteoporosis. Less than 60 kg of body weight and less than 155 cm indicates poor nutrition condition. Fats and bone, both serve during the development of skeleton to achieve good density of minerals. Many of the study have suggested a proportional relation between BMD and body mass index [27].

It was also reported by many of the researchers that there is less awareness of osteoporotic condition among the Indian women. Women are less known about the risk issues and consequences of osteoporosis. It was found that a positive relation exist between increase in knowledge and decrease in osteoporotic condition. So, patient education by the experts is also valuable to eradicate osteoporosis [28].

#### **Prevention And Treatment:**

Prevention of fracture in this disorder is critical as it leads to pain and immobilization. Regular testing of BMD to the postmenopausal is also recommended. Measurement of height once a year can also be advised. Diet should be calcium reached (1K to 12K mg/day). Experience of body to sunlight for the synthesis of vitamin D by the skin can also be advised. Diet rich in vitamin D is also recommended to the risky person. Daily weight bearing work out is recommended. Cessation of alcohol and cigarette improve the bone health [29].

Drugs used for the treatment of osteoporosis are anti-catabolic agents and anabolic agents. Selection will depend on the mechanism of their action to reduce fraction and their influence on bone remodeling. In mild cases of vertebral fracture reloxifene or bisphosphonate are the choice of drugs. In moderate to severe vertebral fracture, Bisphosphonates are the choice of drug. In case if the target is to reduce risk of mild to moderate non vertebral and vertebral fractures, then choice of drug is Bisphosphonates. In case of sever osteoporosis with

previous fracture history, the choice of drugs will be teriparatide. Further evaluation is still needed for the selection of other drugs for treatment in India [2].

### CONCLUSION

From review I came to conclusion that, early diagnosis, advance diagnostic technique, awareness, patient education and proper management can leads to reduction in the burden by osteoporosis. More research needed in above said areas.

### REFERENCES:

- Panda D. Women Empowerment in India: Rational and Present State. *Int J Emerg Res in Managem & Tech* **2017**; 6(9):169-175.
- Malhotra N. and Mital. Osteoporosis in Indian. *Ind J Medical & Res* **2008**;127:263-267.
- Kanis J, Delmas P. Guideline for the diagnosis and Management of Osteoporosis. The European foundation for osteoporosis and bone disease. *Oste Int* **1997**;7(4): 390-406.
- Subramaniyam R. Gender bias in India. *Oxf Econ Pap* **1996**;48(2):280-299.
- Khadilkar A, Sayyad M, et al. Low calcium intake and hypo-vitaminosis D in adolescent girls. *Arch Dis Child* **2007**;92(11):1045.
- Puri S, Marwaha RK, et al. Vitamin D status of apparently healthy school-girls from two dissimilar socioeconomic strata in Delhi: relation to nourishment and lifestyle. *Br J Nutr* **2008**;99(4):876-882.
- National Institute of Nutrition, Indian Council of Medical Research; Dietary Guidelines for Indians: A Manual. 2nd edition **2011**.
- Government of India; Ministry of Women & Child Development. Revised Nutritional & Feeding Norm for Supplementary nourishment in ICDS Scheme: **2009**.
- Harmalingam M, Prasanna Kumar KM, et al. Study of bone mineral density in post menopausal women. *Bone* **2003**;32:178.
- Kadam N, Khadilkar A, et al. Low bone mass in Urban Indian women > 40 years of age: prevalence & risk factors. *Gynecol Endocrinol* **2010**;26(12):909-916.
- Aggarwal N, Ravendran A, et al. Prevalence & related risk factor of Osteoporosis in peri- & post-menopausal Indian women. *J Midlife Health*. **2011**;2(2):81-86.
- Marwaha RK, Tandon N, et al. Bones health in healthier Indian population aged 50 years & above. *Osteoporos Int* **2011**;22(11):2829-2836.
- Agrawal T, et al. A Cross sectional study of Osteoporosis among women. *Med J Armed Forces Ind* **2013**;69(2): 168-171.
- Nikose S, et al. prevalence of osteoporosis in female population of rural central India. *J WH care* **2015**;4(5).
- Sridevi Ar, Ragi V. management of osteoporosis in women: A prevalence & interventional study. *Inter. AIM*. **2016**;3(4):140-45.
- Nambisan B, et al. Prevalence & determinant of osteoporosis in women aged 40-60yrs. *IJRCOG* **2016**; 5(12):4434-40.
- Das B, et al. prevalence & risk factor of osteopenia & osteoporosis in Indian women. *J DMS* **2016**;15(2):15-18.
- Abirami P, et al. assess the prevalence of osteoporosis among middle aged women in mamandur. *IJPCR* **2017**;9(11):690-95.
- Vaishya R, et al. Assessment of Osteoporotic fracture risk in urban Indian population using quantitative ultrasonography and FRXA tool. *IJMR* **2017**;146(S):51-56.
- Jha S, Kaushal N, et al. Prevalence of osteoporosis & osteopenia in apparently healthy Indian population. *O & S* **2018**;4:53-60.
- Kadam NS, et al. Prevalence of Osteoporosis in apparently healthy adults > 40 years of age in Pune city. *IJEM* **2018**;22:67-73.
- Sharma PK, Krishna A, et al. low bone mineral density & its risk factor in urban adult population of south India. *Int J Health A Sc* **2019**;8:61-70.
- ICMR annual report, Assessment of osteoporosis in adult Population in India multicity project **2007**. Available from [http:// icmr. Nic.in /animal/2007-08](http://icmr.Nic.in /animal/2007-08).
- Mitra S, et al. Vit. D receptor gene polymorphisms & bone mineral density in postmenopausal Indian women. *Maturitas* **2006**;55(1):27-35.
- Mitra S, Desai M, et.al. Association of estrogen receptor  $\alpha$  gene polymorphism with bone mineral density in postmenopausal Indian women. *Mol Genet Metab* **2006**; 87(1):80-87.
- Harnarayan CV, Prasad UV, et al. High prevalence of low dietary calcium, high phytate consumption, and vitamin D deficiency in healthy south Indians. *Am J Clin Nutri* **2007**;85(4):1062-67.
- Arya V, et al. Vitamin D status and its relationship with bone mineral density in healthy Asian Indians. *Osteoporosis Int* **2004**;15(1):56-61.
- GayatrPriya N, et al. knowledge on Osteoporosis prevention among bahraini women. *J Adv Pharm Edu Res* **2017**;74(4):397-403.
- Cosman F, et al. Clinician's guide to prevention & treatment of Osteoporosis. *Osteoporosis Int* **2014**; 25(10):2359-81.

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