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Sanjeev Chaudhary
Consultant, Chaudhary Hospital, Sakkardara, Nagpur, Maharashtra, India

Abhishek P Bhalotia
Consultant, Epione Hospital LLP, Gondia, Maharashtra, India

Vinay Yadav
Senior Resident, Department of Orthopaedics, Indira Gandhi Government Medical College, Nagpur, Maharashtra, India

Vijaysing Chandele
Senior Resident, Department of Orthopaedics, Indira Gandhi Government Medical College, Nagpur, Maharashtra, India

Epidemiology of osteoporosis in Vidarbha (India) and influence of environmental factor on osteoporosis

Sanjeev Chaudhary, Abhishek P Bhalotia, Vinay Yadav and Vijaysing Chandele

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Abstract
Introduction: Osteoporosis is the leading challenge for orthopaedic surgeons and its burden is increasing very fast. This study is conducted in the Vidarbha region of Maharashtra to know the epidemiology and effect of environmental factors on osteoporosis.
Material and Methods: It's an observational study conducted on 3287 women with age above 45 years. These patients were selected from the nine districts of Vidarbha region in Maharashtra. The assessment of bone density was done by using quantitative ultrasound technique at heel.
Results: Overall prevalence of osteoporosis in Vidarbha region in women above 45 years age was 43.33%. The prevalence was highest among executive job group (55.2%) and least among tribal women (31.08%). Education and literacy level does not influence the occurrence of osteoporosis.
Conclusion: The prevalence of osteoporosis is rising very fast with increase in sedentary life style and nutritional hazards. Environmental factors clearly impact the occurrence of osteoporosis in different subset of population.

Keywords: osteoporosis, vidarbha, prevalence

1. Introduction
Osteoporosis is a skeletal disease characterized by compromised bone strength predisposing to an increased risk of fracture [1]. Bone strength reflects the integration of two main features: bone density and bone quality [2]. It's a biggest challenge for orthopaedic surgeons with rising incidence of osteoporotic fractures.

India is Osteoporotic Capital in the world with 1 out of 8 males and 1 out of 3 females in India suffer from osteoporosis [3]. In 2003, approximately 26 million people affected from osteoporosis. In 2013, approximately 36 million people affected from osteoporosis. Osteoporotic fractures occur 10-20 years earlier than in western countries.

The impact of environmental factor is not well explored in the pathogenesis of osteoporosis. The aetiology of osteoporosis is comprised of modifiable and non-modifiable risk factors. This study has been done to study epidemiology of osteoporosis in Vidarbha (India) and influence of environmental factor on osteoporosis.

2. Materials and Methods
It's an observational study conducted on 3287 women with age above 45 years. The Study was conducted in 9 districts of Vidarbha namely Nagpur, Akola, Amravati, Yavatmal, Buldhana, Wardha, Gadchiroli, Chandrapur, Gondia. Women were categorized into 7 different groups based on profession, socio-economic status, literacy, life style and diet habits. The groups were as follows,
1. Women working in executive job
2. Tribals
3. Farm workers
4. Housewives
5. Teachers
6. Construction labours
7. General labours

Correspondence
Vinay Yadav
Senior Resident, Department of Orthopaedics, Indira Gandhi Government Medical College, Nagpur, Maharashtra, India

The assessment of bone density was done by using quantitative ultrasound technique at heel. The assessment camps were conducted at different districts for different categories of women.

3. Results
Overall prevalence of osteoporosis in Vidarbha region in women above 45 years age was 43.33%. The prevalence was highest among executive job group (55.2%) and least among tribal women (31.08%) (Table 1). Education and literacy level does not influence the occurrence of osteoporosis. Broadly classifying the categories osteoporosis was high amongst working women, teachers and house wives. However it is low in tribal, farm workers and labour class women. Education and literacy standard does not influence the occurrence of osteoporosis. Average T-scores were calculated and it was worst in executive job women and best in tribal women (Table 2).

Osteoporosis is caused by modifiable and non-modifiable factors. We have study the role of some modifiable environmental factors in this study like sunlight exposure, activity level, milk and nicotine consumption. High sunlight exposure and increased activity levels in the tribal and farm worker group accounts for decreased prevalence compared to executive job and housewife group. Milk consumption was least in the working women and accounts for highest prevalence of osteoporosis.

Table 1: Category wise prevalence of osteoporosis

Category	Prevalence
Executive Job	55.2%
Housewifes	49.48%
Teachers	49.36%
General Labourers	41.46%
Construction workers	33.69%
Farm workers	32.83%
Tribals	31.08%

Table 2: Category wise average T-score

Category	T-score
Executive Job	-3.1
Housewifes	-3
Teachers	-2.9
General Labourers	-2.8
Construction workers	-2.8
Farm workers	-2.7
Tribals	-2.6

4. Discussion
India is now becoming the osteoporosis capital in the world. It's a biggest challenge to tackle osteoporosis and the morbidity associated with it. We have studied different groups of population in a particular region to identify the effect of environmental factors and nutritional habits on the prevalence of osteoporosis.

Marwaha *et al.* reported an overall prevalence of 42.5% osteoporosis in women above 50 years of age at any of the three sites studied (LS, FN, and forearm) [4]. Lu *et al.* have reported a prevalence of 18.4% in Chinese women above 50 years of age while Korean women showed a prevalence of 24.4% at LS [5]. However, none of these studies have classified women based on their geographical status. A study in Iranian women above 45 years reported a prevalence of 50.7% at the LS [6] while another study by Ejaz *et al.* suggests a higher prevalence of osteoporosis in Pakistani postmenopausal women (49.3%) [7]. The high prevalence of osteoporosis in these populations maybe attributable to the high prevalence of Vitamin D deficiency found in them. Other Indian studies by Marwaha *et al.*, Aggarwal (2011) [8] and Shetty *et al.* [9], have also reported high prevalence of osteopenia in Indian women indicating the need to target this population at risk for preventing the progression to osteoporosis in future.

One of the limitations of our study is that with increasing age, comorbidities increase and the number of apparently healthy adults who do not suffer from any chronic conditions goes down. This may be one of the reasons for less number of individuals in higher age groups which may have further brought down the prevalence of osteoporosis in the present study. The present study has been carried out in Vidarbha region, and therefore, the prevalence figures may not be applicable to the whole of India. Thus, large-scale multi-centric studies to establish the burden of osteoporosis in Indian adults are warranted.

To summarize, prevalence of osteoporosis is rising very fast in India and now we are the capital of osteoporosis burden in the world. Environmental factors have huge role in the prevalence of osteoporosis. This warrants intervention strategies aimed at creating awareness about osteoporosis and its risk factors in Indian women.

5. Conclusion
The prevalence of osteoporosis is rising very fast with increase in sedentary life style and nutritional hazards. Environmental factors clearly impact the occurrence of osteoporosis in different subset of population. Sunlight exposure, milk consumption and activity levels are crucial factors in the development of osteoporosis according to this study. To the contrary, affluent society is having highest prevalence of osteoporosis in this region.

6. Consent
Written informed consent was obtained from each patient included in the study.

7. Conflict of interests
There is no conflict of interests to be declared.

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