

Male osteoporosis – the problem statement among South India men

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Abstract

Two points worth noting about osteoporosis in India - high incidence among men and lower age of peak incidence compared to Western countries. 1 out of 8 males and 1 out of 3 females in India suffers from osteoporosis. The incidence of hip fracture is 1 woman to 1 man. In Western countries, the peak incidence of osteoporosis occurs at 70-80 years of age, in India it afflicts at age 50-60. But there is a worrying trend of increasing prevalence of osteoporosis among the younger men in India that has been under studied. This cross-sectional study was conducted in a tertiary care centre. With informed consent, male subjects were evaluated clinically including anthropometry and history, biochemically with 25-OH Vitamin D and radiologically with DEXA scan. Calculation of T score and categorization as osteoporosis, osteopenia, and normal BMD was done as per WHO classification and data was analyzed. The male population having decreased bone mass was more than expected. Osteoporosis and osteopenia are prevalent in younger male population too contrary to the popular belief. A significantly large proportion of south Indian men had osteoporosis and vitamin D deficiency. Further interventional studies are needed to look at reduction in end points like fractures and morbidity in these subjects.

Keywords: male osteoporosis, DEXA scan, vitamin D deficiency.

Introduction

Osteoporosis is “a systemic skeletal disease characterized by low bone mass and micro-architectural deterioration of bone tissue with a consequent increase in bone fragility and susceptibility to fracture” (WHO, 1994). Osteoporosis in men is now recognized as a major underestimated public health problem. With the gradual increase in life expectancy, advancing age related illnesses are increasing [1]. After the age of fifty, one out of three osteoporotic fractures are seen in men. Furthermore, an in depth understanding of this subject has revealed that about fifty percent of these causes are potentially treatable. Studies have shown that men with osteoporotic fractures have a much higher mortality and morbidity when compared to women [2]. This may add on to the economic burden in a developing country like India, where men may be the only earning members in many families.

The mortality after osteoporosis-related fracture is higher in men than women; mortality ratio after hip fracture was found to be 3.2 for men and 2.2 for women [3]. Similar to west, osteoporotic fractures are a major cause of morbidity and mortality in elderly Indians. The osteoporosis and osteopenia may occur at a relatively younger age in Indian population [4]. In addition to genetic determinants, several life-style related factors like physical activity, calcium intake, smoking, alcohol consumption, and vitamin D status may influence the bone mass in men[5]. However, the prevalence and influence of these factors may vary according to ethnicity.

Screening for osteoporosis in men is usually recommended above the age of 70 years [1,5]. However, its relevance in relation to the variability in ethnicity requires validation through

prospective studies. There are differences in peak bone mass, body frame, and nutrition and life style factors among various populations [1]. There are no clear guidelines available for screening men with osteoporosis among ethnic groups other than the Caucasian population. In this study, we have attempted to look at the prevalence of osteoporosis and vitamin D status in healthy South Indian men and to study the influence of various life style factors on bone mineral density.

Materials and methods

The study was a cross sectional one conducted in a tertiary care centre in Coimbatore.

Inclusion criteria

- The study included healthy males at or above 50 year of age who were free from apparent illness studied.

Exclusion criteria

- Men with a history of chronic liver or renal disease, hyperthyroidism, hyperparathyroidism, hypogonadism, rheumatoid arthritis, ankylosing spondylitis, primary hyperparathyroidism, chronic obstructive pulmonary disease, chronic smokers, chronic alcoholism and malabsorption.
- Men on medications such as bisphosphonates, thyroxine, steroids, immunosuppressive therapy, anti-epileptics, calcitonin, anti-retroviral, and anti-tuberculous therapy
- Patients with previous history of fractures, hip replacement, kyphosis or scoliosis

The data included age, sex, height, weight, BMI, a past history of fragility fracture, parental history of hip fracture, history of smoking or alcohol intake (3 or more units/day), the presence of rheumatoid arthritis, and any other history suggestive of secondary osteoporosis were studied.

BMD was assessed using the Hologic Discovery WI bone densitometer machine at the right hip by the same technician. The WHO classification was used for categorization of BMD. Osteoporosis was defined as T score ≤ -2.5 , osteopenia or low bone mass -1 to -2.5 and normal as > -1 [6,7]. Blood work to assess serum (25-OH) cholecalciferol was done for the same subjects to evaluate vitamin D deficiency.

Results

The study population consists of 200 males > 50 years in various age groups (Fig 1). The BMI insignificantly decreased with advancing age (Fig 2). The mean BMD at total hip was normal in age groups 50–60 and 61–70 years, osteopenic in age 71–80 years, while osteoporotic in age above 80 years. Since there were only three subjects in the fourth group (>80 years age), results cannot be generalized. Only 13.5% men had sufficient vitamin D levels, the rest 86.5% had deficiency (28.5% had insufficient levels and 58% had low deficit values). Surprisingly, young men in the fifth decade were found to have compromised bone health in both vitamin D levels and BMD. The trend of bone health in men in the study group in both fifth and sixth decade of life is almost the same. Middle aged men in their 50's and 60's were found to have insufficient vitamin D levels of 19.41ng/ml and 20.56ng/ml respectively and demonstrated low bone mineral density in DEXA scan (Fig 3, 4). Overall in the study group, BMD results shows compromised bone health in 101 men (17 osteoporotic and 84 osteopenic), nearly 50% of the study group and the rest 99 men had normal bone density (Fig 5).

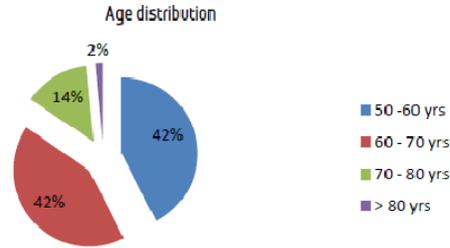


Figure 1

Table 1

Mean distribution (n=200)	
Age	62.17 ± 7.64 yrs
Height	163.79 ± 6.93 cm
weight	64.20 ± 11.30 kg
BMI	23.90 ± 3.73 kg/m ²
S.25-OH cholecalciferol	18.96 ± 10.23 ng/ml

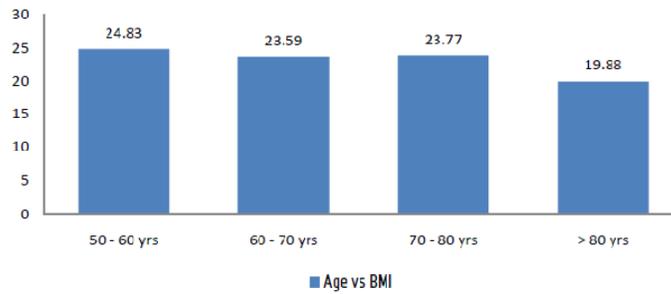


Figure 2

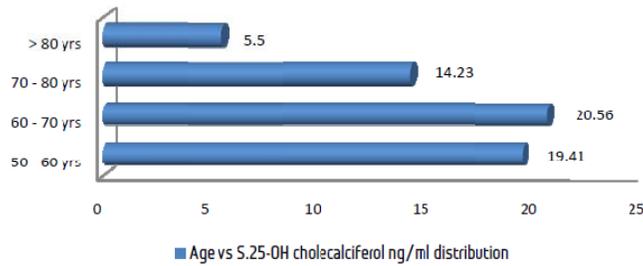


Figure 3

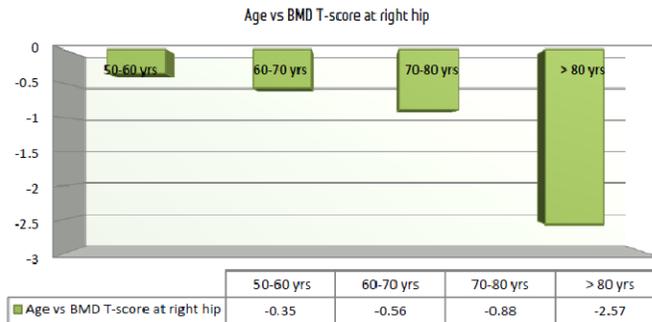


Figure 4

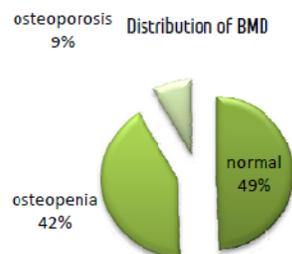


Figure 5

Discussion

Male osteoporosis is an underreported public health problem. In our study, we attempted to look at the prevalence of osteoporosis and the various risk factors in South Indian healthy men above the age of 50 years. In previously published literature, a 9 % prevalence of osteoporosis has been reported in Northern India[8]. However, in another study at Rochester [9], a 19% prevalence of osteoporosis has been reported, which bears similarity to our study. The differences in the prevalence that was seen between south Indian and north Indian subjects would have been due to many factors like genetic, nutritional, and other environmental factors. They need to be looked at in further prospective studies.

BMD begins to decline after the third decade and is influenced by genetic and environmental factors. Prepubertal BMD is similar in both sexes. However, the pubertal increase in BMD is more in men when compared to women due to a greater cross sectional area in view of increased periosteal apposition under the influence of androgens. Bone remodeling with aging leads to trabecular thinning in men, whereas loss of trabecular connectivity in women. Decline in BMD in men may begin as early as 30–40 years. However, the accelerated menopausal bone loss may not be seen. The estimated rate of bone loss with aging in men is about 1% per year[10].

Osteoporosis and Risk of Fracture: Morbidity, Mortality, and Economic Burden Associated with Fracture

The most dreaded complication of osteoporosis is hip fracture, which has been reported to be more in men when compared to women. Osteoporosis in men accounts for more than 30–40% of overall fracture. Fracture in men follows a bimodal presentation with peaks at adolescence and after 60 years. The morbidity and mortality associated with hip fractures in men has been reported as high as 33% [11]. Moreover, a three to four time's higher mortality rate has been described in men with hip fracture when compared to females. The economic burden of osteoporotic fractures is not only borne by the patient but by the country as a whole. The major costs may not only include that of investigations, surgery, or long term management of these patients but also the large number of man hours that is lost by these men after they sustain a fracture. This is particularly relevant in developing countries like India where there is an increase in the aging population[12].

Vitamin D deficiency and BMD

A high prevalence of vitamin D deficiency has been reported in various cohorts of Indian population. Vitamin D deficiency can either decrease mineralization or cause secondary hyperparathyroidism or both resulting in a low bone mineral density [13]. A low vitamin D may also cause proximal myopathy predisposing these patients to a fall and subsequent fracture.

However looking closely, only 13.5 % subjects had sufficient 25(OH) vitamin D levels, while out of rest, 58 % had either low or deficient level. Vitamin D deficiency is quite prevalent in India. Goswami et al. [14], in a study from Delhi, reported that up to 90 % of apparently healthy urban office workers and hospital staff had moderate to severe vitamin D deficiency. Tandon et al.[15]evaluated young healthy men (n=40) and women (n=50) between

20 and 30 years of age from the Indian paramilitary forces and found a mean vitamin D level 18.4ng/ml in men. Arya et al. [16]reported that 78.3 % subjects were diagnosed to be vitamin D deficient/insufficient from study done at Lucknow (North India). Zargar et al. [17]from Kashmir valley studied 92 healthy natives; out of them, 64 were men. They observed that 49 of the 64 males (76.56 %) were vitamin D deficient. Vupputuri et al. [18]reported 25-OH D levels below 20ng/ml in 94.3%of study subjects from north India.

In the present study, with advancing age, fewer subjects had sufficient vitamin D level (more than 30ng/ml) and more subjects had low (less than 10ng/ml) or deficient level. This can be due to decreased formation of vitamin D in skin and poor absorption in gastrointestinal tract with age[19].In our observation, BMD was positively correlated with 25-OH vitamin D level. The subjects with normal mean BMD at total hip had mean 25-OH vitamin D level above 22ng/ml while subjects with osteopenia at total hip had mean 25-OH vitamin D level just above 15ng/ml.

Arya et al. [16]also reported that low serum 25-OH D level is possibly one of the reasons for lower BMD among Indians. Several investigators from west had reported significantly lower hip BMD in subjects with low serum 25-OH D concentrations. Besides, vitamin D supplementation led to beneficial effect on hip BMD[20]. In recent Indian study by Marwaha et al. [21], prevalence of osteoporosis ranged from 2.6 to18.0 % in males. Their study subjects also included those with past history of fractures, while our study excluded any subject with past or present osteoporotic fracture. All these studies suggest that osteoporosis in men is not uncommon as previously believed, and the prevalence rates might be different because of various DXA machines used, or difference in selection criteria. Marwaha et al. [21] reported reduced mean BMI with advancing age in Indian men and women and also observed that prevalence of osteoporosis increased with age in females, but not in males. Lekamwasam et al. [22]reported 5.8 % prevalence of osteoporosis among men older than 50 years in Sri Lanka, and it increased with advancing age.

Conclusion

A significantly larger proportion of otherwise normal healthy men in our community had osteoporosis and vitamin D deficiency. This study indicates that osteoporosis and osteopenia are prevalent in younger male population too contrary to the popular belief. Large scale prospective studies with interventions are needed to look at the reduction in the end points like number of incident fractures and morbidity associated with them.

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