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Osteoporosis in developing countries

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Osteoporosis poses a huge challenge in developing countries due to demographic transition and aging of the population coupled with limited availability of resources. The exact disease burden is difficult to quantify because of the paucity of data. Ethnicity affects bone density as well as fracture risk. Population-specific normative data for bone density are lacking in large parts of the world. Vitamin D deficiency is common even in sunny countries. The WHO has developed an algorithm for estimation of 10-year fracture risk which may be used even in the absence of bone mineral density.

Key words: osteoporosis; fracture; vitamin D; fracture risk; developing countries; Asia; Africa; Middle East; Latin America.

Osteoporosis is 'a skeletal disorder characterized by compromised bone strength predisposing to an increased risk of fracture'.[1] Bone strength is a composite of bone density and bone quality. Bone density, unlike bone quality, lends itself to easy measurement and is used in the World Health Organization (WHO) operational definition of osteoporosis, which is bone density 2.5 standard deviations (SD) below the mean for young adult white women.[2] Osteoporosis, despite being a common metabolic bone disease, has attracted little attention and even less action in many developing countries. There are several reasons for this state of neglect.

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1. The belief that osteoporosis is a disease of the developed nations and does not pose a problem for developing countries.
2. Acceptance of osteoporosis as an inevitable consequence of aging which can be neither treated nor prevented.
3. Preoccupation of the health planners with infectious diseases. Even amongst non-communicable diseases, coronary artery disease occupies centre stage, with bone health being relegated to the background.
4. Patients with fracture are seldom investigated for osteoporosis.
5. Resource constraints with limited availability of diagnostic facilities.
6. Paucity of epidemiological data.

Globally, there is a distinct shift in the distribution of deaths from younger to older ages and from communicable to non-communicable causes.[3,4] Of the three major groups of causes responsible for overall disease and injury burden (group 1: communicable, maternal, perinatal, and nutritional disorders; group 2: non-communicable diseases; group 3: injuries), the ratio of burden from group-2 to group-1 disorders is used as an index of the epidemiological transition. Group-2 disorders, which occur mainly in older populations, now cause a greater burden than group-1 disorders in China, Latin America and the Caribbean, whereas other developing countries of Asia and the Middle Eastern crescent are not yet at this point. Sub-Saharan Africa remains in an early phase. In this scenario, osteoporosis is emerging as an important public-health problem in developing countries.

This review presents the epidemiology of osteoporosis and osteoporotic fracture in developing countries. Issues such as factors affecting bone mineral density (BMD), vitamin D deficiency and its impact on bone health, population-specific reference norms for bone densitometry and fracture risk assessment are discussed.

EPIDEMIOLOGY OF OSTEOPOROSIS IN DEVELOPING COUNTRIES

The incidence of osteoporosis is best measured indirectly, as the incidence of fractures attributed to the condition, while prevalence is best measured by the frequency of reduced BMD or numbers of those with vertebral deformity.[5] The prevalence of osteoporosis in less developed and developing countries is not clear, as there are few studies in these populations. However, ethnic differences in BMD are well known. Blacks have greater BMD than Caucasians. Hispanics are similar to Caucasians, while Asians have the lowest BMD. Barrett-Connor et al[6] studied a cohort of 197,848 community-dwelling postmenopausal women (179,470 White, 7784 Black, 1912 Asian, 6973 Hispanic, and 1708 Native American) without known osteoporosis from the United States. Heel, forearm, or finger BMD was measured, and 82% of subjects followed for 1 year for new fractures. Based on WHO criteria, 11.9% of Native American women, 10% of Asians, 9.8% of Hispanics, 7.2% of Whites, and 4.2% of Blacks were osteoporotic, while osteopenia was demonstrated in 50.1% of Asians, 46.5% of Hispanics, 44.5% of Native Americans, 39.6% of Whites, and 28.1% of Blacks. All groups showed a decline in T scores with increasing age. Ethnic differences in BMD were strongly influenced by body weight. Fracture rates were lowest in black and Asian women within each age group, whereas white and Hispanic women had the highest fracture rates, suggesting that ethnicity influences fracture risk too. Similar results have been reported by other authors.[7–10] It is pertinent to note that all the aforementioned studies were carried out in the United States/Europe and included Asian women (Chinese, Japanese and Filipinas). Ethnic differences in bone density