

Bone mineral density and reference standards for Indian women

Osteoporosis is a silent bone metabolic disease that causes risks for future fractures. At present, Bone Mineral Density (BMD) as measured by Dual Energy X-Ray Absorptiometry (DXA) provides the measure of bone health.

Many of the published studies from various parts of India, including Ranu Patni's data, reported in this issue of the JMHI, have shown lower values of BMD among young Indian women (when peak bone mass is supposed to be accreted) as compared to those established by the National Health and Nutrition Examination Survey (NHANES) III reference database in women aged 20 – 29 years, as the reference range.^[1-3]

A large community-based, four center study (Hyderabad, Lucknow, Mumbai, and New Delhi), as reported by the Indian Council of Medical Research (ICMR), has determined the Peak Bone Mineral Density (PBMD) values at the hip, lumber spine, and forearm in healthy Indian men and women aged 20 – 29 years. (n = 404 men, n = 404 women).^[3] The study has shown that there were significant center-wise differences in BMD values. As there was a homogeneity of variance of BMD across the four centers, when the Levene's test of homogeneity of variance was applied, and also a meager absolute relative difference in BMD, at each center for all the three sites measured, it was possible to pool the data of all the centers. The mean BMD values in women were 0.901 ± 0.111 , 0.538 ± 0.044 , and 0.954 ± 0.095 at the hip, forearm, and spine. The ICMR study has proposed the cut-off values for diagnosing osteoporosis in women as 0.624, 0.428, and 0.717 gm/cm².

Thus, at present, the above-cited studies, do provide population-based standards of peak BMD for our population. However, in an interesting article the authors point out the reported paradox of lower fracture rates among the Indo-Asian population than those in Caucasian women, in face of lower skeletal mass at maturity in Indo-Asian women.^[4] It has been suggested that it is possible that when one takes into consideration the 'depth' of the bone, as measured by an estimation of

volumetric density these differences disappear.^[4-6] There may be a need in our women to measure bone mineral apparent density (BMAD), which is an estimation of volumetric density. There is a suggestion that lower BMD values in Asians may be a size-related artifact. It would be of interest to have data from longitudinal studies, which would be useful in correlating the BMD values with the fracture risk in our population.

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