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Vitamin D levels should be multiplied by ten for children: study

By Stephen Daniells, 28-May-2008

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Raising current vitamin D levels from 200 International Units (IU) to 2,000 IU could boost bone health amongst children and have long-term health benefits, says new research.

Only children given the equivalent of 2,000 IUs a day of vitamin D3 increased their blood levels of the vitamin to th level considered optimal for adults, according to results of a placebo-controlled study to be published in the *Journa of Clinical Endocrinology & Metabolism*.

"Our research reveals that vitamin D, at doses equivalent to 2,000 IUs a day, is not only safe for adolescents, but i is actually necessary for achieving desirable vitamin D levels," said lead researcher Ghada El-Haff Fuleihan from th American University of Beirut-Medical Center, Lebanon.

Vitamin D refers to two biologically inactive precursors - D3, also known as cholecalciferol, and D2, also known as ergocalciferol. Both D3 and D2 precursors are hydroxylated in the liver and kidneys to form 25- hydroxyvitamin D (25(OH)D), the non-active 'storage' form, and 1,25-dihydroxyvitamin D (1,25(OH)2D), the biologically active form that is tightly controlled by the body.

There is growing evidence that 1,25(OH)2D has anticancer effects, but the discovery that non-kidney cells can also hydroxylate 25(OH)D had profound implications, implying that higher 25(OH)D levels could protect against cancer the local sites.

New data

The researchers recruited 10 to 17 year-olds to take part in two studies to test the effects of short-term and a long term supplementation with vitamin D3. For the short-term study, 25 students (10 girls) were given a weekly dose 14,000 IU for eight weeks. This study was conducted during the summer and early autumn, when the highest vitamin D levels are reached naturally.

For the long-term, 340 students (168 girls) were given either a low dose of vitamin D (1,400 IUs each week) or a high dose (14,000 IUs each week) for one year.

Fuleihan and co-workers report that only children receiving the equivalent of 2,000 IU a day of vitamin D showed the necessary increases in 25(OH)D levels to the 30 nanogram per millilitre level considered optimal for adults. Moreover, no evidence of vitamin D intoxication was reported in either the short- or long-term trial.

"This report provides a substantial database establishing the long term safety of weekly high doses of vitamin D at critical time for bone mass accretion," wrote the authors in the JCEM.

"Although most, but not all, experts agree that a 25(OH)D level of 30 ng/ml is desirable in adults, what constitutes an optimal D level for the younger subjects is more debatable.

"In children, similarly to adults, the mean 25(OH)D response to each 100 IU of additional oral vitamin D3 is approximately 1 ng/mL (2.5 nmol/L). Therefore, in children with a serum 25(OH)D concentration below 20 ng/mL (less than 50 nmol/L), a vitamin D dose equivalent to 2000 IU per day, preferably as vitamin D3 as opposed to vitamin D2, would be an advisable replacement dose.

"The high prevalence of hypovitaminosis D worldwide across all age groups, the fact that many diseases of adulthood are rooted in the pediatric age group, and the safety data available to-date render it quite compelling to modify the current recommendations regarding adequate vitamin D intake not only for adults but also for children, they concluded.

Both the National Academy of Sciences' Institute of Medicine and the American Academy of Pediatrics currently recommend an adequate daily intake of 200 IUs of vitamin D for children.

Voices grow louder for raised levels

Calls to increase the current recommendations of 200 IU per day for children and adults up to 50 years of age for vitamin D up to 800 - 1000 IU vitamin D3, have become more frequent in both scientific and public circles.

Reports in prestigious journals such as the *New England Journal of Medicine* and the *American Journal of Clinical Nutrition* have called for raises to the recommendations.

Because of the low dietary amounts, and lack of sunshine in northern climates, some estimates claim that as much as 60 per cent of northern populations may be vitamin D deficient.

In adults, vitamin D deficiency may precipitate or exacerbate osteopenia, osteoporosis, muscle weakness, fractures common cancers, autoimmune diseases, infectious diseases and cardiovascular diseases.

Source: *Journal of Clinical Endocrinology & Metabolism*

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"Short-term and long-term safety of weekly high-dose vitamin D3 supplementation in school children"

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