

BONE

Maternal vitamin D status and bone variables in neonates

Maternal vitamin D status is associated with bone mineral content and the cross-sectional area of the distal tibia in newborn offspring, according to researchers from Finland.

Vitamin D deficiency is a serious health concern in all age groups in Finland. The Finnish population, living in the northern latitudes, is prone to vitamin D deficiency and over 6 months of the year relies entirely on dietary sources to maintain whole-body vitamin D levels.

Previously, Viljakainen *et al.* have studied the effect of vitamin D on bone health in different age groups. “The main goal has been to define adequate vitamin D intake for a population based on optimal bone health,” explains lead author Heli T. Viljakainen from the University of Helsinki. “The current project expands our knowledge to pregnant women and their newborn babies.”

In an ongoing cross-sectional study, the researchers aim to investigate the effect of maternal vitamin D status on the offspring’s bone at birth, to study whether these effects persist during early childhood, and to determine the effects on the maternal skeleton during and after pregnancy.

Between October and December 2007, 125 healthy, pregnant women, aged 20–40 years, were recruited during the last trimester of their pregnancy, at an antenatal visit to the birth hospital. All

pregnancies, except one, were uneventful and full-term and included in the study.

Serum samples from mothers were obtained during the first trimester and 2 days postpartum, and from umbilical cords at birth, to determine levels of 25-hydroxyvitamin D, parathyroid hormone and bone remodeling markers. This repeated assessment of 25-hydroxyvitamin D levels and dietary intake of vitamin D was made to increase the reliability of the results. Bone variables were measured in mothers and their offspring with a peripheral quantitative CT.

The median value of the individual means for serum 25-hydroxyvitamin D during the first trimester and 2 days postpartum (42.6 nmol/l) was used as a cut-off to define two groups for analysis. Neonates born to mothers with levels of serum 25-hydroxyvitamin D below the median were heavier, had lower tibia bone mineral content and a smaller tibia cross-sectional area than those born to mothers in the above median group. No difference in BMD was observed.

“Our findings are in accordance with earlier studies showing that children born to mothers with low vitamin D status during late pregnancy have reduced whole-body bone mineral content, bone area and areal BMD at age 9 years,” comments Viljakainen.

In line with current Nordic recommendations for pregnant women (10 µg or 400 IU vitamin D daily), the



average maternal total intake of vitamin D in this study was 14.3 µg. Nevertheless, 71% of women during pregnancy and 15% of neonates were vitamin D deficient. The investigators are currently following the families for 3 years and are planning strategies to increase the intake of vitamin D and to improve vitamin D status in the general population in Finland.

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