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Is vitamin D deficiency in pregnancy associated with birth weight and other anthropometric measures?

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Background and Aim: Vitamin D deficiency has been associated with adverse health outcomes for mother and child. We investigated associations between serum-25-hydroxyvitamin D [25(OH)D] in pregnancy and birth weight and other neonatal anthropometric measures.

Methods: Population-based, multiethnic cohort study of 823 pregnant women (59% ethnic minorities) attending the Child Health Clinics for antenatal care in Oslo, Norway and their offspring. Birth weight of 719 singletons, neonates born at <37 weeks was measured, including study representative measurements of crown-heel-length, head circumference, abdominal circumference and skinfold thickness. At gestational weeks (GW) 15 and 28, maternal S-25(OH)D was measured. Ethnicity was categorized according to country of birth and information about a range of explanatory factors (parity, educational level, pre-pregnancy BMI) was collected. Women with 25(OH)D <37 nmol/L at GW 15 were recommended vitamin D3 supplementation. Maternal 25(OH)D was categorized: consistently low, consistently high, increasing and decreasing. Separate linear regression analyses were performed to model the associations between explanatory factors and each of the outcomes: birth weight, crown- heel -length, head circumference, abdominal circumference, sum skinfold thickness and ponderal index.

Results: In early pregnancy, 51% of the women had 25(OH)D <50 nmol/L. In univariate analyses maternal 25(OH)D in early pregnancy was significantly ($p<0.05$ for all) associated with birth weight, crown- heel -length, head circumference, abdominal circumference and ponderal index. After adjusting for maternal age, parity, educational level, pre-pregnancy BMI, gestational age and neonate gender, 25(OH)D was still associated with birth weight, head circumference, abdominal circumference and ponderal index. However, after adjusting for ethnicity, 25(OH)D was no longer associated with any of the outcomes. The same was found for those with consistently low and consistently high 25(OH)D, and for those which had an increase or decrease in 25(OH)D during pregnancy.

Conclusions: Maternal 25(OH)D in pregnancy is not associated with birth weight or other anthropometric measures after adjusting for ethnicity.