Child Health Research Institute

University of Nebraska Medical Center

Children's Hospital & Medical Center

MATERNAL VITAMIN D LEVELS AND THE RELATIONSHIP TO NEONATAL ANTHROPOMETRIC MEASUREMENTS

Theresa Trautman[1], Matthew VanOrmer[1], Rebecca Slotkowski[1], Anum Akbar[1], Taija Hahka[1], Kara Bown[1], Braden Fink[1], Madison Han[1], Rose McCoy[1], Annie Nguyen[1], Dannielle Schutz[1], Denise Torres[1], Corrine Hanson[2], Melissa Thoene[1], Ann Anderson-Berry[1]

[1]Department of Pediatrics, University of Nebraska Medical Center, Omaha, NE 68198
[2]College of Allied Health Professions, University of Nebraska Medical Center, Omaha, NE 68198

Numerous studies have highlighted vitamin D as a crucial component in growth, development, immunity, and is a nutrient of particular importance during pregnancy. Current literature suggests that pregnant and lactating women are at a greater risk for vitamin D deficiency. Although vitamin D supplementation during pregnancy has been well-studied, the observed consequences for neonates vary. Understanding the impact of vitamin D status on optimal infant growth may inform nutritional recommendations in pregnant women - especially those at-risk of preterm delivery. Neonatal anthropometric measures will be significantly higher in infants born of Vitamin D-sufficient mothers. An IRB-approved study collected maternal and cord blood samples at delivery at a midwestern academic medical center. 105 maternal samples and 86 cord samples were available for analysis. Plasma concentrations of vitamin D (25-OH-D) were determined using high performance liquid chromatography. Vitamin D deficiency was defined as total 25-OH-D levels < 20ng/mL per the Institute of Medicine. Infant birthweight, length, and head circumference percentiles were obtained from the electronic medical record. Mann-Whitney U tests were used to compare anthropometric growth measurements between maternal and infant vitamin D deficiency groups. A p-value of <0.05 was considered statistically significant. Of the 105 maternal fetal dyads, 11.4% were preterm births (<37wk gestational age). Median maternal level of circulating 25-OH-D was 39.3ng/mL with 7.6% of mothers being deficient. The median infant circulating level of 25-OH-D was 23.734ng/mL with 24.8% of infants being deficient. Maternal and cord levels of total 25-OH-D were highly correlated (R=0.765, p<0.001). Median birth head circumference percentiles were significantly higher in infants of vitamin D-sufficient mothers vs deficient mothers (64.23% vs. 17.64%, p=0.05) There were no significant differences in birthweight percentile (p=0.386) or birth length percentile (p=0.437) between maternal sufficiency groups, or any significant differences between infant deficiency groups. Our findings indicate that higher maternal levels of vitamin D may be related to higher infant head circumference percentiles at birth. Neonatal head circumference is associated with brain growth and is used to diagnose conditions such as microcephaly. Previous research has suggested that vitamin D might be involved in brain function as a "neurosteroid" in adults. It is unclear whether this function extends to neonates, but this finding might be one explanation of our findings. Limitations of this study include small sample size and low numbers of deficient participants. Future studies should explore neonatal outcomes in a larger vitamin D deficient population.