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Early pregnancy vitamin D status and risk of select congenital anomalies in the National Birth Defects Prevention Study

Nedghie Adrien [1] [2], Olivia R Orta [2], Eirini Nestoridi [2], Suzan L Carmichael [3] [4], Mahsa M Yazdy [2], For The National Birth Defects Prevention Study

Affiliations

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Abstract

Introduction: Vitamin D deficiency is associated with adverse pregnancy events. However, its role in the etiology of congenital anomalies remains unclear. We examined the association between vitamin D status, measured through prepregnancy diet, UV exposure, season of conception, and congenital anomalies.

Methods: We used data from the National Birth Defects Prevention Study, a U.S. population-based case-control study (1997-2011). Prepregnancy dietary vitamin D was calculated from food frequency questionnaires and evaluated using tertiles, based on the distribution in controls. We used the National Oceanic and Atmospheric Administration Weather Service to assign UV indices based on location and estimated date of conception, then dichotomized UV exposure (low vs. high). Seasons of conception was categorized as fall/winter spring/summer. We used logistic regression to estimate adjusted odds ratios (aOR) and 95% confidence intervals (CI).

Results: Lower prepregnancy dietary vitamin D intake (<65.21 IU/d vs. >107.55 IU/d) was associated with increased odds of anencephaly (aOR = 1.28, 95% CI 1.01, 1.63), hypospadias (aOR = 1.21, 95% CI 1.04, 1.40), septal defects (aOR = 1.16, 95% CI 1.05, 1.30), diaphragmatic hernia (aOR = 1.42, 95% CI 1.13, 1.79), and gastroschisis (aOR = 1.27, 95% CI 1.07, 1.52). Findings were consistent when we stratified by UV exposure and season of conception.

Conclusions: Our findings suggest lower dietary intake of vitamin D may be associated with increased risk of select congenital anomalies. Further investigations are warranted to evaluate the effects of other nutrients and appropriate thresholds and sources of vitamin D using serum.

Keywords: UV; congenital anomalies; diet; seasons; sunlight; vitamin D.

LinkOut – more resources