A compromised maternal vitamin D status is associated with congenital heart defects in offspring.

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BACKGROUND: Interactions between genetic and environmental factors, including modifiable maternal nutrition and lifestyle, play a significant role in the pathogenesis of most congenital heart defects (CHD). The aim of this study was to investigate associations between periconceptional maternal vitamin D status and the prevalence of CHD in offspring.

METHODS: A case-control study was performed in 345 mothers of a child with CHD and 432 mothers of a child without CHD from four tertiary hospitals in the Netherlands between 2003 and 2005. Approximately 15 months after pregnancy mothers filled out questionnaires regarding general characteristics and periconceptional lifestyle. Maternal blood was obtained to determine serum 25-hydroxyvitamin D and lipid concentrations. The 25-hydroxyvitamin D concentration was stratified into a deficient <50nmol/l, moderate 50-75nmol/l and adequate >75nmol/l status. Logistic regression was performed to study associations between vitamin D status and CHD risk, adjusted for maternal age, body mass index, ethnicity, smoking and total cholesterol concentration.

RESULTS: Case mothers less often had an adequate vitamin D status compared with controls (27% vs. 38%; p=0.002). The use of multivitamin supplements, ethnicity, season and body mass index were associated with vitamin D concentrations. A moderate (odds ratio 1.58, [95%CI 1.08, 2.32]) and deficient (odds ratio 2.15, [95%CI 1.44-3.19]) vitamin D status were associated with CHD in offspring.

CONCLUSION: A compromised maternal vitamin D status is associated with an approximately two-fold increased prevalence of CHD in offspring. Therefore, improvement of the periconceptional maternal vitamin D status is recommended.

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