

Longitudinal analysis of serum 25-hydroxyvitamin D during pregnancy

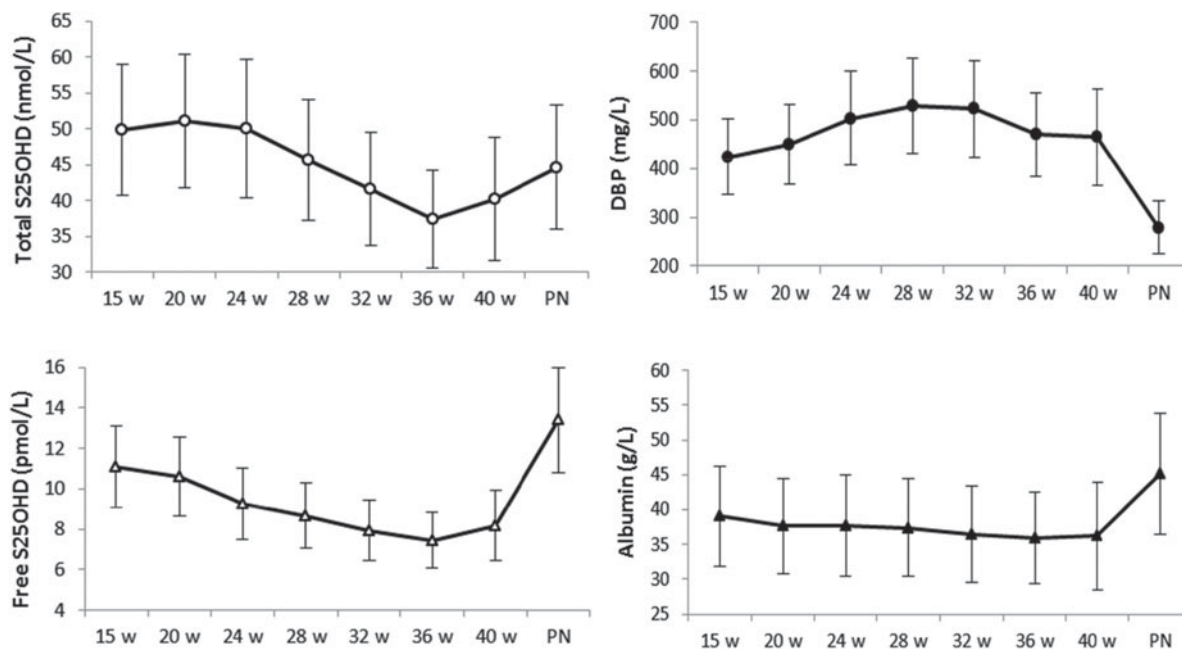
J. Y. Zhang¹, A. J. Lucey¹, R. Horgan², L. C. Kenny² and M. Kiely¹

¹Vitamin D Research Group, School of Food and Nutritional Sciences, University College Cork and ²Anu Research Centre, Department of Obstetrics and Gynaecology, University College Cork, Ireland

The nutritional requirement for vitamin D to promote healthy pregnancy is not known. Reference values for serum 25-hydroxyvitamin D (25OHD) based on non-pregnant adults are not necessarily suitable at different stages of gestation due to hemodilution (blood volume increases by ~50% by 36 weeks' gestation) and altered vitamin D metabolism during pregnancy. Conflicting data have been reported on the impact of pregnancy on levels of different vitamin D metabolites⁽¹⁾. The aim of this study was to define the impact of gestational age on serum 25OHD concentrations.

We conducted a longitudinal analysis of total and free (unbound) serum 25OHD, vitamin D binding protein (DBP) and albumin in a random sample of 30 women from the SCOPE (Screening for Pregnancy Endpoints: www.scopestudy.net) pregnancy cohort study at 15, 20, 24, 28, 32, 36 and 40 weeks' gestation and post-natally (PN). Women were recruited at 15 weeks' gestation from May-September 2009 and delivered between November and March. Serum 25OHD and DBP were measured by ELISA; albumin by a colorimetric method and free 25OHD was calculated from total 25OHD, DBP and albumin⁽²⁾.

Serum albumin decreased during pregnancy, with a nadir at 36 weeks' gestation ($P < 0.005$), when it was ~80% of the PN concentration. Serum DBP increased during pregnancy against the hemodilution gradient and at 28 weeks' gestation, DBP was almost double the PN level, ($P < 0.001$). Both total and free 25OHD concentrations decreased (both $P < 0.005$) as pregnancy progressed and both were lowest at 36 weeks' gestation. At 15 weeks, 10 and 63% had serum 25OHD < 30 and 50 nmol/L, respectively, which increased to 53% < 30 and 80% < 50 nmol/L at 36 weeks.



While there was a seasonal effect on serum 25OHD in women recruited from July to September, this study suggests an impact of gestational stage on total 25OHD concentration. Reduced free 25OHD during pregnancy is probably due to the increased levels of DBP. There is a need to establish gestational stage-specific reference intervals for serum 25OHD during pregnancy.

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1. Brannon PM & Picciano MF (2011) *Annu Rev Nutr* 31, 89–115.
2. Bikle DD, Gee E, Halloran B *et al.* (1986) *J Clin Endocrinol Metab* 63, 954–959.