

Over- and undernutrition: challenges and approaches. 29 June–2 July 2009

Prevalence of vitamin D deficiency and insufficiency in pregnant women: a longitudinal study

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Maternal vitamin D insufficiency is associated with childhood rickets and longer-term problems including schizophrenia and type 1 diabetes⁽¹⁾. Whilst maternal vitamin D insufficiency is common in mothers with highly-pigmented skin⁽²⁾, little is known about the vitamin D status of Caucasian pregnant women.

The aim of the present study was to investigate vitamin D status in Caucasian pregnant women and non-pregnant age-matched controls living at 54°N–55°N. In a longitudinal study plasma 25-hydroxyvitamin D (25(OH)D) was assessed in ninety-nine pregnant women at 12, 20 and 35 weeks of gestation and in thirty-eighty non-pregnant women sampled concurrently.

Plasma 25(OH)D concentrations were lower in pregnant women compared with non-pregnant women at 20 and 35 weeks of gestation ($P < 0.0001$). The percentage of pregnant women below the various cut-off values for vitamin D deficiency and insufficiency are presented in the Table.

Weeks of gestation.	12		20		35	
	n*	%*	n*	%*	n*	%*
<12.5 (Severe deficiency)	2	2	1	1	1	1
<25 (Deficiency)	35	35	44	44	16	16
<50 (Insufficiency)	95	96	95	96	74	75
<80 (Insufficiency)	98	99	99	100	97	98
<100 (Insufficiency)	99	100	99	100	99	100

*Data are cumulative.

While severe vitamin D deficiency (25(OH)D < 12.5 nmol/l) was not apparent in the non-pregnant controls at any time-point, >95% of non-pregnant women were classified as insufficient at each time-point, assuming a cut-off of vitamin D insufficiency of <80 nmol/l. Vitamin D status was higher in pregnant women who reported taking multivitamin supplements at 12 ($P < 0.0001$), 20 ($P = 0.001$) and 35 ($P = 0.001$) weeks of gestation than in pregnant non-supplement users; however, supplements did not prevent insufficiency (25(OH)D > 50 nmol/l).

In summary, there is a high prevalence of both vitamin D deficiency and insufficiency in pregnant Caucasian women considered at low risk of vitamin D deficiency living at 54°N–55°N. Women reporting multivitamin supplement usage during pregnancy did have higher vitamin D status, but many remained vitamin D insufficient. Suboptimal vitamin D status has important consequences for maternal and neonatal health, and thus, further research is needed to determine the dietary vitamin D intake required to maintain vitamin D sufficiency during pregnancy and to underpin guidelines for supplement use during pregnancy.

- Holick MF (2004) *Am J Clin Nutr* **80**, 1678S–1688S.
- van der Meer IM, Karamali NS, Boeke AJ *et al.* (2006) *Am J Clin Nutr* **84**, 350–353.