

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

Evidence of a detrimental effect of low vitamin D status on markers of cardiovascular health in the Vitamin D, Food Intake, Nutrition and Exposure to Sunlight in southern England (D-FINES) Study population: ethnic and age influences

O. A. Hakim¹, A. L. Darling¹, S. Starkey¹, M. C. Y. Wong¹, R. Abrams¹, F. Shojaee-Moradie², K. Hart¹, L. M. Morgan¹, J. L. Berry³, A. M. Umpleby², B. A. Griffin¹ and S. A. Lanham-New¹

¹Faculty of Health and Medical Sciences and ²Postgraduate Medical School, University of Surrey, Guildford GU2 7XH, UK and ³Vitamin D Research Group, University of Manchester, Manchester M13 9WL, UK

There are clear associations between vitamin D deficiency and insulin resistance, β -cell dysfunction and reduced insulin secretion. There are also data linking vitamin D 'insufficiency' as a risk factor for metabolic syndrome, hypertension and diabetes, all of which may clarify its association with increased CVD. These associations are particularly apparent in Asian groups and may underlie the considerable predisposition to CVD in this group. Poor vitamin D status may hence be associated with raised total cholesterol and inversely related to the serum concentration of cardio-protective HDL, although limited data on UK populations are available.

The D-FINES Study is currently investigating the interaction between diet and sunlight exposure on vitamin D status in Caucasian and Asian women aged 19–70 (mean 48.0 (SD 14.3)) years living in southern England. Fasted blood samples were collected at three-monthly intervals from summer 2006 to spring 2007 from a total of 279 Caucasian and ninety-four Asian women and dietary intake was assessed during these periods using 4 d estimated food records. Women were recruited through general practice or through Asian community networks in Woking, Kingston and Thornton Health. The aim of the present subsidiary study was to examine the relationship between summer vitamin D status and serum lipid profiles (serum TAG and HDL) and insulin.

Table. Descriptive data and spearman correlation (*r* values) between markers of cardiovascular health and serum 25-hydroxyvitamin D (25-OHD) in Caucasian and Asian women from the D-FINES Study

	All groups (<i>n</i> 373)		Caucasian (<i>n</i> 279)		Asian (<i>n</i> 94)		All groups	Caucasian	Asian
	Mean	SD	Mean	SD	Mean	SD			
Vitamin D status (nmol/l)	58.4	27.0	67.9 ^a	23.1	28.6 ^b	13.1	–	–	–
TAG (mmol/l)	1.17	0.64	1.12 ^a	0.65	1.34 ^b	0.57	–0.29***	–0.25***	–0.19
Cholesterol (mmol/l)	5.03	1.19	5.12 ^a	1.26	4.72 ^b	0.84	–0.01	–0.12	–0.18
HDL (mmol/l)	1.62	0.45	1.67 ^a	0.46	1.46 ^b	0.34	0.19**	0.08	0.14
Insulin (mU/l)	13.2	5.66	12.3 ^a	5.14	16.3 ^b	6.28	–0.24***	–0.10	–0.13

*** $P < 0.001$. ^{a,b}Means with unlike superscript letters were significantly different (Mann-Witney U test; $P = 0.016$ – 0.001).

As shown in the Table, the mean serum 25-OHD level was significantly lower in Asian women compared with Caucasian women ($P < 0.0001$). The mean BMI was 26.0 (SD 4.77) kg/m² for Caucasian women and 27.8 (SD 5.70) kg/m² for Asian women. There was a higher TAG in Asian women compared with Caucasian women ($P < 0.001$) and higher HDL in Caucasian women than in Asian women ($P < 0.002$). Insulin levels were significantly higher in the Asian women ($P < 0.001$). Significant negative correlations were found between markers of cardiovascular health and 25OHD status in all groups combined and then specifically in the Caucasian women but not in the Asian women. Blunting of 25OHD levels, i.e. severe vitamin D deficiency, has been previously noted in Asian women with having a 25OHD level of < 25 nmol/l (depending on seasons)⁽¹⁾ and may explain the lack of association between 25OHD and markers of cardiovascular health. The present findings are a cause for concern and warrant further investigation.

The D-FINES Study is funded by the Food Standards Agency (Project no. NO5064). O. A. H. is grateful to the Royal Embassy of Saudi Arabia for PhD funding.

1. Darling AL, Lovell D, Lee PA *et al.* (2010) *Proc Nutr Soc* 69, OCE1, E125.