Abstract submission

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INTERACTION BETWEEN DIET AND SUNLIGHT EXPOSURE ON VITAMIN D STATUS IN WOMEN LIVING IN SOUTHERN ENGLAND: MULTILEVEL MODELLING ANALYSIS OF THE D-FINES STUDY

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Abstract: The relative contribution of UVB sunlight exposure and dietary vitamin D intake to 25-hydroxyvitamin D (25(OH)D) remains to be fully determined. The aim of this study was to examine these factors in combination using a repeated measures multilevel modelling approach. The D-FINES study investigated 373 Surrey Caucasian and Asian women in four seasons of the year for 25(OH)D, dietary vitamin D and UVB exposure. To capitalise on the clustered nature of the repeated seasonal measurements within individuals, multilevel modelling was undertaken using MLwiN v.2.1 software. Thus seasonal data (dietary vitamin D (DietaryVitD), UV exposure (UVdosi), vitamin D status (VitDstatus)) were included at level one (ij) and individual level data (ethnicity, menopausal status (0=Caucasian, 1=Asian; 0=Premenopausal, 1=Postmenopausal)) at level two (j). Using a random intercept model, the following equation was constructed, which was significantly different from an intercept only model (Log likelihood test- Chi square X2= 2216.51, df=5, p<0.001):

$$25(\text{OH})\text{D}_{ij} = \mu_{0j} - 0.130(0.283)\text{DietaryVitD}_{ij} + 1.199(0.201)\text{UVdosi}_{ij} - 27.559(2.637)$$

$$\text{Ethnicity}_{-j} - 6.082(2.051)\text{Menopause}_{-1j} - 0.020(0.008)\text{UVdosi}^{2ij} + e_{ij}$$

$$\mu_{0j} = 56.650(1.825) + u_{0j}$$

This model showed no effect of diet on 25(OH)D, but did show a significant interaction between Standard Erythema Dose (SED)UV and 25(OH)D. Being of Caucasian ethnicity was associated with a 27.6 nmol/l higher 25(OH)D than Asian ethnicity, and being of premenopausal status was associated with a 6.1 nmol/l higher 25(OH)D than postmenopausal status. Total body fat mass and seasonal dietary calcium had initially been included in the model but were removed as they were not significant parameters. Dietary vitamin D was retained, even though not a significant parameter as it was of high theoretical and practical importance. The implications of this model are that UV exposure has an effect on vitamin D status but dietary vitamin D does not. Ethnicity has a greater influence than menopausal status. This work is funded by the FSA (Project No. NO5064). This work was funded by the UK Foods Standards Agency (NO5064). The views expressed are those of the authors alone.

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