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Vitamin D status and body composition in UK Caucasian and South Asian postmenopausal women: results from the DFINES II study

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Several recent studies have suggested an influence of body composition on vitamin D status in humans. Lower concentrations of 25-hydroxvitamin D (25OHD) have been associated with increased risk of osteoporosis, insulin resistance, heart disease and cancer.[1] This study aimed to assess the difference in 25OHD status between Caucasian and South Asian women and to determine whether there was an association between body composition and 25(OH)D status in these two population groups as part of our on-going Vitamin D research at Surrey.

In 2010 the D-FINES II study (Vitamin D, Food Intake, Nutrition and Exposure to Sunlight in Southern England) further investigated 82 Surrey Caucasian and South Asian postmenopausal women for vitamin D status (25-hydroxyvitamin D – 25OHD) and anthropometric measures such as Body Mass Index (BMI), weight, waist and hip. This was a follow on to the main D-FINES study in 2006–2007.[2]

As shown in Table 1 below, significant differences were found in 25OHD status between the Caucasians and South Asian women (median 82 [21.3] nmol/l, $n = 56$ *vs.* 52.5 [21.4] nmol/l, $n = 19$) respectively $P < 0.001$).

Table 1. Vitamin D status and anthropometric measures

	Caucasians						Asians					
	25OHD nmol/L	BMI	Weight kg	Height m	Waist cm	Hip cm	25OHD nmol/L	BMI	Weight kg	Height m	Waist cm	Hip cm
N	56	61	61	61	61	61	19	21	21	21	21	21
Mean	83.9	25.6	67.2	162.1	90.1	104.9	57.3	29.2	70.0	154.6	94.0	109.2
Median	82.0	24.5	64.0	161.0	90.0	104.0	52.5	28.1	65.0	155.5	98.0	108.0
Std.Dev	21.3	4.8	12.0	6.3	10.8	10.2	21.4	4.5	11.1	4.1	9.6	10.44
Min.	39.3	19.0	44.0	148.5	70.0	87.0	25.0	22.1	54.0	144.0	78.0	93.0
Max.	141.5	38.7	103.0	180.0	116.0	132.0	95.3	40.1	91.0	161.5	107.0	126.0

Spearman's correlations were applied to vitamin D and anthropometric analyses, and in Caucasians there was a significant negative association between 25OHD status and BMI ($r = -0.352$, $P < 0.008$), 25OHD status and weight ($r = -0.314$, $P < 0.006$). Similar findings were also seen for waist and hip circumference measurements ($r = -0.398$, $P < 0.002$; $r = -0.420$, $P < 0.001$ respectively. For South Asians, there was no significant correlation between vitamin D status and any of the anthropometric measures.

Overall, the study suggests that anthropometric measures, specifically BMI, weight, waist and hip, are inversely associated with 25-hydroxyvitamin D (25OHD) in Caucasians. The most likely explanation for this would be the lower bioavailability of vitamin D circulating because of its deposition in adipose tissue. This association could also be affected by clothing habits and limited mobility in overweight or obese people[3]. Further research is required to examine the 25OHD/bone composition findings in ethnic groups.

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