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# Associations between Baseline Vitamin D Status, Dietary Intake of Vitamin D and Calcium on Bone Health in Caucasian and South Asian Women: Further analysis of the D2-D3 Study

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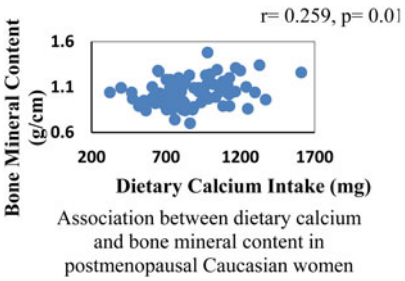
Vitamin D deficiency results in osteomalacia and leads to osteoporosis.[1,2] Hypo-vitaminosis D is prevalent in the UK and our D-FINES study has shown vitamin D deficiency to be more common in South Asian (SA) women than Caucasian (CA) women living in South England[3].

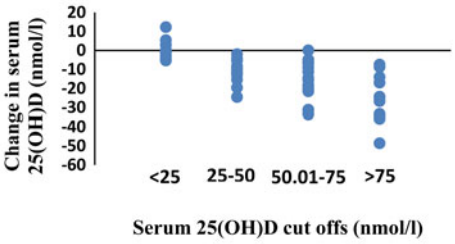
The aim of this study was to investigate the relationship between dietary vitamin D and calcium (Ca) intakes, vitamin D status and bone health indices among the women who took part in our D2-D3 study. The D2-D3 study was a vitamin D RCT previously reported[4] in which vitamin D status was measured by LC/MS and 4d food diaries were used to measure dietary intake. The specific cross-sectional analysis was on the baseline data of 260 women and the longitudinal analysis on 59 women in the placebo group.

Mean dietary vitamin D intakes in SA and CA women were 2·24 ± 2·0, 2·78 ± 2·3 µg, respectively. Mean dietary Ca intakes were 870 ± 261·5 mg in Caucasians and 703·5 ± 211·5 mg in South Asians. Vitamin D status of Caucasians (60·21 ± 25·6 nmol/l) was much higher than that of Asians (21·7 ± 18·1 nmol/l), ($P < 0·001$). Body weight and body fat in Asians and BMI in Caucasians were negatively correlated with serum 25-hydroxyvitamin D status (25OHD) ($P < 0·05$). In SA women, higher vitamin D intake was associated with higher vitamin D status (lowest vitamin D intake T1, 25(OH)D 16·35 nmol/l to highest vitamin D intake T3, 25(OH)D 35·08 nmol/l; F test for linearity, $P = 0·017$), remaining significant after adjusting for age and body size ($P < 0·01$). When Ca and vitamin D intakes were analysed together; increased combined intakes of Ca and vitamin D resulted in higher 25(OH)D (low Ca-low vitamin D, 25(OH)D 16·14 nmol/l to high Ca-high vitamin D, 25(OH)D 28·4 nmol/l; F test for linearity, $P < 0·05$), and this relationship remained significant after adjustments for body size ($P < 0·05$) in the SA women. As shown in the Figures below, increased Ca intakes resulted in higher BMC, in spite of the decreased vitamin D intakes (Medium Ca-High Vitamin D, BMC = 0·9070 g/cm to High Ca-Medium Vitamin D, BMC = 1·1613 g/cm; F test for linearity, $P < 0·01$) in POST-CA women. Women in the placebo group of the D2D3 study with vitamin D deficiency at baseline had a less pronounced decrease in vitamin D status during winter.

These results demonstrate the importance of dietary Ca to bone health and the synergistic beneficial effects of combined dietary Ca and vitamin D intakes on vitamin D status and bone health. Further work is required on endogenous and exogenous factors affecting longitudinal changes in vitamin D status throughout the year.




Association between dietary calcium and bone mineral content in postmenopausal Caucasian women

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