

Ethnic differences in 25-hydroxyvitamin D status at which PTH concentrations plateau: further analysis of the D-FINES cohort

M.M. Mendes¹, A.L. Darling¹, K.H. Hart¹, J.L. Berry² and S.A. Lanham-New¹

¹Department of Nutritional Sciences, Faculty of Health and Medical Sciences, University of Surrey, Guildford, Surrey, UK, GU2 7XH and ²Vitamin D Research Group, University of Manchester, M13 9PT, UK

The definition of optimal vitamin D status has commonly been derived from the level of 25-hydroxyvitamin D [25(OH)D] at which parathyroid hormone (PTH) levels reach a minimum plateau. Previous findings have been shown this plateau to be extremely variable, with values ranging from <30 nmol/L up to >100 nmol/L.^{1,2} This variation might be explained by between study differences in the ethnic group investigated, methodology, and latitude.¹ The current study aimed to assess the optimal concentration of 25(OH)D which minimises PTH concentration in Caucasian and South Asian women, in each season of the year. Using data from the D-FINES (Vitamin D, Food Intake, Nutrition and Exposure to Sunlight in Southern England) study (2006–2007; FSA funded Project N05064), 25(OH)D and PTH measurements from 350 women (84 South Asian and 266 Caucasian, age mean 48.04 [14–35] years old) dwelling in the South-East of England were used to analyse the association between 25(OH)D status and PTH levels. Non-linear modelling, using SPSS software (version 21, Chicago IL), was used to model the relationship between serum 25(OH)D and PTH for each season and for each ethnic group separately. Quadratic models were statistically significant for both ethnic groups in summer (Figures 1–2), autumn and winter ($P < 0.05$), but in spring for the Caucasians only ($P < 0.05$). For the Caucasians, whose 25(OH)D ranged from 13–18 nmol/l to 90–180 nmol/L, depending on season, the level where PTH appeared to be at a minimum was 75–100 nmol/L in summer ($r^2 = 0.044$ $p = 0.003$ $n = 266$), autumn ($r^2 = 0.037$ $p = 0.015$ $n = 226$) and spring: ($r^2 = 0.068$ $p = 0.001$ $n = 193$) whereas for winter it was at 50–60 nmol/L ($r^2 = 0.048$ $p = 0.010$ $n = 192$). For the South Asians, with 25(OH)D ranging from 8–12 nmol/l to 60–85 nmol/l, depending on season, PTH was at a minimum at 40–50 nmol/L in summer ($r^2 = 0.081$ $p = 0.033$ $n = 84$) autumn ($r^2 = 0.098$ $p = 0.063$ $n = 58$) and winter ($r^2 = 0.129$ $p = 0.029$ $n = 55$).

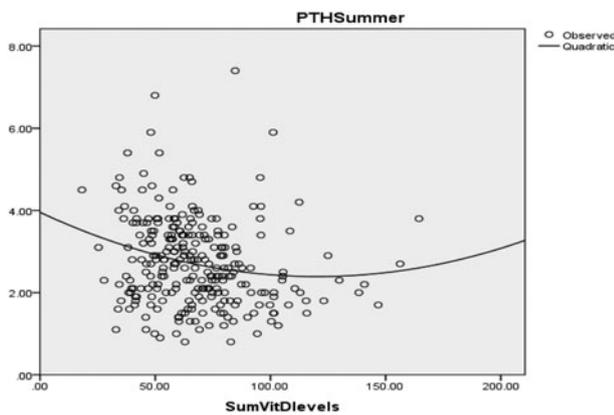


Fig. 1. Relationship between serum 25(OH)D and PTH during Summer in Caucasian women.

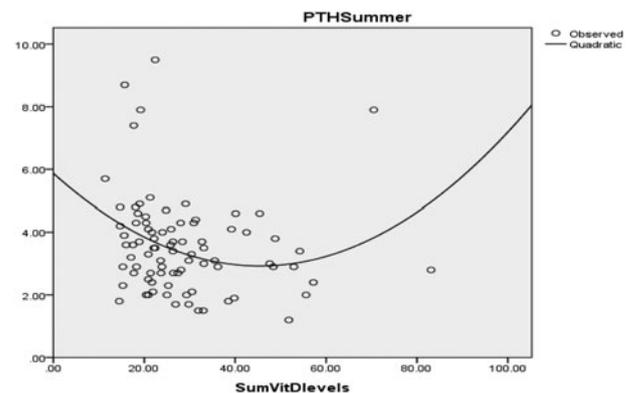


Fig. 2. Relationship between serum 25(OH)D and PTH during Summer in South Asian women.

These findings suggest a difference in optimal levels of 25(OH)D between these two ethnic groups, whereby Caucasians may have a higher requirement for 25(OH)D to reach the PTH minimum plateau. Alternatively, this difference could be due to the Caucasian group having higher and more variable vitamin D levels than the Asian women. Our finding of similar levels of 25(OH)D at which PTH is at a minimum throughout all the seasons, as well as a difference in the plateau between these two ethnic groups, has not been previously demonstrated and could be of great relevance for further discussions regarding the estimation of optimal cut-offs for vitamin D levels. Further research into this finding with larger sample sizes, and including South Asians with higher 25(OH)D concentrations are now required.

MMM is a recipient of the Science Without Borders Scholarship Award. The D-FINES study was funded by UK Foods Standards Agency (Project No. N05064). All views are those of the authors alone.

- Hirani V, Mosdol A, Mishra G. (2009) *Br J Nutr.* **101**, 760–4.
- Lappe JM, Davies KM, Travers-Gustafson D, Heaney RP. (2006) *J Am Coll Nutr.* **25**, 395–402.