# PostScript

## LETTERS

### Low calcium intake and hypovitaminosis D in adolescent girls

We recently reported that 73% of adolescent girls attending an inner city school in Manchester, UK had hypovitaminosis D (serum 25-hydroxyvitamin D concentration <30 nmol/l). However, none of the subjects had clinical features of vitamin D deficiency or disturbance of their serum calcium or inorganic phosphate concentrations.[1] Rajeswari *et al*[2] have suggested that low dietary calcium intake, which is common in many parts of India, exacerbates symptoms of vitamin D deficiency.

We studied 50 post-menarchal girls from a state-run school in Pune, India during February 2006, using a similar protocol to that used previously.[1] Informed consent was obtained from parents and the study was approved by the Ethical Committee of the Hirabai Cowasji Jehangir Medical Research Institute. None of the subjects were receiving vitamin D or any other dietary supplements. A 7 day food frequency questionnaire and Gopalan *et al*'s[3] tables of the nutrient value of Indian foods were used to estimate daily dietary intake of calcium and vitamin D.

The findings of this study were compared with those of a companion study previously undertaken in Manchester (table 1). While there are always problems when comparing two cross-sectional studies, undertaken in different continents and using different biochemical assays, we were surprised to find that the prevalence of hypovitaminosis D in Pune girls (70%) living at latitude 18.34° N (abundant sunshine) was similar to that in Manchester girls (73%) living at latitude 53.4°N. Secondary hyperparathyroidism, low serum calcium concentration, musculoskeletal symptoms and skeletal deformities were also more common among Pune girls. The median dietary calcium intake of Pune girls was 449 (356–538) mg/day, which is lower than the recommended intake for girls of this age in the UK (800 mg/day). Furthermore, the dietary calcium in Pune girls was derived from non-dairy products, such as vegetables, pulses and cereals, from which only approximately 10% of calcium is absorbed. Thus, the estimated amount of dietary calcium absorbed by Pune girls was only around 58 mg/day, explaining the higher incidence of secondary hyperparathyroidism. High serum parathyroid hormone concentration leads to increased synthesis of 1,25-dihydroxyvitamin D, which is known to degrade 25-hydroxyvitamin D to inactive 24,25-dihydroxyvitamin D, thereby depleting body stores of vitamin D.[4] We therefore speculate that cutaneous vitamin D synthesis might have been normal in Pune girls but that their low calcium and high fibre diet led to depletion of body stores of vitamin D. From the results of this and our previous study,[1] we conclude that dietary calcium intake should be considered when assessing the adequacy of an individual's vitamin D status.

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#### References

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**Table 1** Clinical, biochemical and dietary parameters of Pune and Manchester girls

| | Pune girls,* (n = 50) | Manchester girls,† (n = 51) |
|---|---|---|
| Age (SD), years | 14.7 (0.7) | 15.3 (0.4) |
| Weight, median (range), kg | 39.4 (35.9–42.9) | 54.5 (50.0–61.0) |
| Height, median (range), cm | 150.8 (5.32) | 158.5 (5.4) |
| Body surface area exposed to sunlight, median (range) | 30% | 14% (9.0%–19.0%) |
| Subjects with serum 25-hydroxyvitamin D concentrations <30 nmol/l | 70% | 73% |
| Subjects with parathyroid hormone concentration above the upper end of the assay reference range | 48% | 3% |
| Subjects with serum calcium concentration below the lower end of the assay reference range | 74% | 0% |
| Subjects who complained of non-specific aches and pains | 76% | 26% |
| Subjects with genu varum or genu valgum | 44% | 0% |
| Median time in seconds to complete the Gower's manoeuvre (a measure or proximal muscle function) | 3 (2–5) | 2.6 (2–4.4) |
| Estimated dietary vitamin D intake, μg/day | 0.1 (0.1–0.8) | 0.2 (0.1–0.9) |
| Estimated calcium intake (mg/day) derived from dairy products | 65 (31–76) | 401 (195–594) |
| Estimated daily total calcium intake, mg/day | 449 (356–538) | Data not available |

*Intact serum parathyroid hormone among Pune girls was measured using an immunoassay (BioSource, Europe, Nivelles, Belgium). The reference range is 1.1–6.4 pmol/l, sensitivity is 0.22 pmol/l and interassay variation is 10%. Serum concentration of 25-hydroxyvitamin D was measured using radioimmunoassay (DiaSorin, Stillwater, MN, USA). The sensitivity is 3.75 nmol/l and interassay variation is <5%.
†Biochemical assays have been previously described.[1]

### Blood pressure charts in UK children

The study by Jackson *et al* on blood pressure centiles for Great Britain[1] provides us with valuable information and insight into children's blood pressure centiles measured on automated monitors. This is the first time we have been able to see normative data for such large numbers of children in the UK.

There are, however, a few things in this publication that we would like to discuss. It is generally accepted that blood pressure in children depends not only on sex and age but also on the height of the child. The correlation with height is physiologic and needs to be taken into consideration when evaluating the child. In, for example, 2-year-old girls with height between the 5th and 95th centile, this difference can be 7 mm Hg. Thus, we were surprised to see only a weak correlation with height and disappointed to see that the authors' extensive data were not integrated with height.

The correlation with weight, found by the authors, has more to do with the increasing and often pathologic blood pressure in obesity. We also wondered if this strong correlation was related to the size of the blood pressure cuff. The difference between a cuff that