Concurrent Session 6: Micronutrients

Being outdoors is good for bones - the skeletal response to sunlight deprivation

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Background – Insufficient sunlight exposure results in decreased serum 25(OH) vitamin D levels and increased parathyroid hormone (PTH) and bone turnover. For reasons not well understood, the bone loss that follows appears to be confined to cortical bone, sparing trabecular bone. This regional specificity may account for the increased risk for hip fractures with vitamin D deficiency.
Objective – To investigate the site-specificity of the skeletal response, and the magnitude of the endocrine changes to decreased vitamin D, we used Antarctic expeditioners as a model for sunlight deprivation as UV exposure is limited for the majority of the expedition.
Design – Fifty-nine healthy expeditioners (mean age 42.5 yrs, range 20-62 yrs) provided blood samples and had lumbar spine (LS) and femoral neck (FN) region bone mineral density (BMD) assessed using densitometry (DXA) before departure and on return from Antarctica one year later. An additional blood sample was taken, and dietary intake assessed mid-expedition. Serum samples were tested for vitamin D, PTH, and calcium (normal and adjusted). Changes over time were determined using repeated measures ANOVA, with adjustments for multiple comparisons.
Outcomes – Vitamin D and serum calcium (unadjusted) were lower ($P < 0.01$) and PTH higher ($P < 0.09$) at 6 and 12 months compared to baseline. BMD at the trochanteric, inter-trochanteric, and total hip regions, but not the LS (-0.4% NS) were 1-2% lower at 12 months than baseline ($p < 0.05$). When all data were pooled, inverse relationships were observed between vitamin D and PTH ($r = - 0.23$, $P < 0.01$), and PTH and calcium (normal and adjusted) ($r = - 0.22$, $P < 0.01$), and BMD ($r = - 0.19 - 0.22$, $P < 0.06 – 0.09$). By expedition end, 90% of expeditioners were vitamin D deficient. A baseline vitamin D of > 100 nmol/l was needed to maintain adequacy for the expedition.
Conclusions – Limited sunlight exposure in normal healthy adults results in a rapid decline in vitamin D and a concomitant reduction in BMD at predominantly cortical sites. Without nutritional sources of vitamin D it is unlikely that vitamin D adequacy can be maintained. If BMD losses are not reinstated following repetitive periods of prolonged sunlight deprivation then such individuals may be at heightened risk of hip fractures.

Vitamin D status of South Asian women living in New Zealand

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Background – A role for vitamin D deficiency is implicated in an ever-increasing list of diseases, including the conditions associated with metabolic syndrome. South Asian populations in New Zealand and abroad, have demonstrated low levels of serum vitamin D, and increased rates of type 2 diabetes and cardiovascular disease.
Objective – To determine the serum 25-hydroxyvitamin D [25(OH)D] levels of South Asian women living in Auckland, New Zealand, and to investigate attitudes to sun exposure.
Design – 189 women, aged 20-plus years and of South Asian origin living in Auckland, NZ, were tested for serum 25(OH)D. They also completed a questionnaire about attitudes to sun exposure. Exclusion criteria included taking vitamin D supplements > 1000 IU/day. Deficiency cut-offs were based on the position statement of the Australia New Zealand Bone and Mineral Society.
Outcomes – Only 17.5% of this group had sufficient serum 25(OH)D concentrations (>50nmol/L), while 11.1% demonstrated severe deficiency (< 12.5nmol/L), 28.0% moderate deficiency (12.5–25nmol/L) and 43.4% mild deficiency (25–50nmol/L). Of the 87 questionnaire responses available, 34 (39%) confirmed that they did not actively avoid the sun, whilst 22 (26%) named their main reason for avoiding the sun as NZ's Public Health messages. Only 2 women claimed to avoid the sun for cultural or religious reasons, 11 for specific health reasons, and 17 to avoid darkening their skin.
Conclusions – This data suggests that the South Asian population resident in New Zealand is at high risk of being vitamin D deficient. The remedy may lie in increased fortification of the food supply, or widespread supplementation, but the level of effective supplementation is yet to be determined.