



The role of sunlight exposure in determining the vitamin D status of the U.K. white adult population.

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Abstract

BACKGROUND: Vitamin D is necessary for bone health and is potentially protective against a range of malignancies. Opinions are divided on whether the proposed optimal circulating 25-hydroxyvitamin D [25(OH)D] level (≥ 32 ng mL⁻¹) is an appropriate and feasible target at population level.

OBJECTIVES: We examined whether personal sunlight exposure levels can provide vitamin D sufficient (≥ 20 ng mL⁻¹) and optimal status in the U.K. public.

METHODS: This prospective cohort study measured circulating 25(OH)D monthly for 12 months in 125 white adults aged 20-60 years in Greater Manchester. Dietary vitamin D and personal ultraviolet radiation (UVR) exposure were assessed over 1-2 weeks in each season. The primary analysis determined the post-summer peak 25(OH)D required to maintain sufficiency in wintertime.

RESULTS: Dietary vitamin D remained low in all seasons (median 3.27 μ g daily, range 2.76-4.15) while personal UVR exposure levels were high in spring and summer, low in autumn and negligible in winter. Mean 25(OH)D levels were highest in September [28.4 ng mL⁻¹; 28% optimal, zero deficient (<5 ng mL⁻¹)], and lowest in February (18.3 ng mL⁻¹; 7% optimal, 5% deficient). A February 25(OH)D level of 20 ng mL⁻¹ was achieved following a mean (95% confidence interval) late summer level of 30.4 (25.6-35.2) and 34.9 (27.9-41.9) ng mL⁻¹ in women and men, respectively, with 62% of variance explained by gender and September levels.

CONCLUSIONS: Late summer 25(OH)D levels approximating the optimal range are required to retain sufficiency throughout the U.K. winter. Currently the majority of the population fails to reach this post-summer level and becomes vitamin D insufficient during the winter.

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