Study: Ultraviolet-B Radiation Could Improve Widespread Vitamin D Deficiency

Ambient-UVB radiation could improve 25(OH)D prediction in the future, improving widespread vitamin D deficiencies among non-White individuals.

Researchers have announced findings from a cross-sectional study that assessed ambient ultraviolet-B (UVB) radiation and its impacts on vitamin D status across different racial and ethnic populations. The results showed widespread vitamin D deficiency among non-White individuals. However, ambient UVB radiation could improve vitamin D status.[1]

Vitamin D is synthesized in the skin through exposure to UVB solar radiation, which could be impacted by sunlight intensity, age, and skin tone. Dermal synthesis could additionally be impacted by seeking or avoiding sunshine, sunscreen, and clothing.[1]

“During exposure to sunlight, the UVB photons enter the skin and photolyze 7-dehydrocholesterol to previtamin D3 which, in turn, is isomerized by the body's temperature to vitamin D3. Most humans have depended on sun for their vitamin D requirement,” said study authors in a news release.[2]

Further research has found that UVB-induced dermal synthesis accounts for 80% to 100% of vitamin D that is required in the body, emphasizing the importance of sunlight.[1] If that is not attainable, individuals can take a vitamin D supplement or ingest vitamin D-rich foods like fatty fish, beef liver, egg yolks, and cheese.[3]

The study authors noted that following vitamin D circulation, it is converted into 25 hydroxyvitamin D [25(OH)D], a strong biomarker of vitamin D status. However, changes in 25(OH)D responses differ between individuals as a decrease in vitamin D could occur in individuals that are overweight, obese, or older.[1]

In this study, the UK Biobank (UKBB) included 438,978 individuals that resided in England, Scotland, and Wales, using UVB data from the Tropospheric Emission Monitoring Internet Service that were matched to the individual’s residence. Ethnicity was self-reported, including Asian (Indian, Pakistani, Bangladeshi, Chinese, and any other Asian background), Black (Caribbean, African, and any other Black background), and White (British, Irish, and any other White background). Participants were required to complete a questionnaire, an interview, physical measurements, and provide biological samples. Blood samples were used to measure 25(OH)D concentration using chemiluminescent immunoassay.[1]

“We categorized vitamin D status as: 25(OH)D < 25 (deficiency), 25–39.99 (high deficiency risk), 40–50 (low deficiency risk) and >50 (sufficiency, as defined by the 2011 Institute of Medicine report) but use 25(OH)D in continuous form unless stated otherwise,” said study authors, in a news release.[1]

Among the included individuals, the median age was 58 years old, 53.5% were female, 41.5% reported taking vitamin D supplements, and 66.9% were classified as overweight or obese, according to the study authors.[1]

The results showed that the median 25(OH)D varied according to ethnicity. Among Asian respondents the median was 25.4 nmol/L (10.2 ng/mL); among Black participants it was 30.6 nmol/L (12.2 ng/mL);

and among White participants it was 47.9 nmol/L (19.2 ng/mL), according to study authors.[1] Further results found that UVB was a large analyst of 25(OH)D, meaning ambient-UVB radiation could improve 25(OH)D prediction in the future, improving the widespread vitamin D deficiencies among non-White individuals.[1]

References
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