

Caucasians who avoid sun exposure more likely to be vitamin D deficient

November 3 2011

Light-skinned people who avoid the sun are twice as likely to suffer from vitamin D deficiency as those who do not, according to a study of nearly 6,000 people by researchers at the Stanford University School of Medicine. Surprisingly, the use of sunscreen did not significantly affect blood levels of vitamin D, perhaps because users were applying too little or too infrequently, the researchers speculate.

The study adds to a growing debate about how to balance the dangers of sun exposure with the need for appropriate levels of vitamin D to prevent bone diseases such as osteoporosis and rickets.

"It's not as simple as telling everyone to wear sunscreen," said dermatologist Eleni Linos, MD PhD. "We may instead need to begin tailoring our recommendations to the skin tones and lifestyles of individual patients. It's clearly a very complex issue."

Linos, who is now an assistant professor of dermatology at the University of California-San Francisco, was a Stanford resident when the research was conducted. She is the first author of the research, which will be published online Nov. 4 in *Cancer Causes and Control*. Assistant professor of dermatology Jean Tang, MD, PhD, is the senior author.

Vitamin D is produced by the skin in response to exposure to the ultraviolet rays in sunlight; too little of the vitamin causes bone weakening and rickets and possibly contributes to many other [chronic diseases](#) including cancer. Small amounts of vitamin D can also be

acquired by drinking fortified milk, eating fortified breakfast cereals or eating [fatty fish](#) such as salmon, tuna and mackerel, as well as from over-the-counter dietary supplements. Although it's not clear exactly how many people may be deficient in the vitamin, experts believe about 30 to 40 percent of the United States population may be affected.

Linos and Tang analyzed population-base data from the U.S. National Health and [Nutrition Examination Survey](#) collected by the [Centers for Disease Control and Prevention](#) from 2003 to 2006. The survey included questions about sun-protective behavior, inquiring whether respondents frequently wore long sleeves, hats and sunscreen, and whether they sought out shade on sunny days. It also included each respondent's race, as well as their blood levels of a form of vitamin D called 25-hydroxyvitamin D.

The researchers found that Caucasians who avoided the sun with clothing or stayed in the shade had blood levels of vitamin D that were about 3.5 and 2.2 nanograms per milliliter lower than those who did not report such behavior. In contrast, the association between sun avoidance and reductions in vitamin D levels in Hispanic or African-American survey-takers was not statistically significant. "This may be explained by the inherent pigmentation in darker skin, which acts as natural sun protection," said Linos. (The researchers did not analyze Asians as a separate group.)

The researchers considered any respondent with [blood levels](#) of 20 nanograms per milliliter or below to be vitamin D deficient because lower levels have been associated with adverse health outcomes. They found that although about 40 percent of all survey participants were vitamin D deficient, the prevalence increased to 53 and 56 percent among those who wore long sleeves and stayed in the shade. Whites who wore long sleeves and stayed in the shade were twice as likely to be deficient in the vitamin as those who did not (odds ratios of 2.16 and

2.11, respectively).

Race affects vitamin D production because of differences in skin pigmentation. Highly pigmented skin protects against ultraviolet rays, but also leads to lower overall baseline levels of vitamin D in the blood and frequent [vitamin D deficiency](#). In the current study, African-Americans who rarely took sun-protective measures had an average vitamin D blood level of about 14.5 nanograms per milliliter. Hispanics who didn't avoid the sun had an average level of about 19.7 and sun-loving Caucasians, about 26.4. In contrast, those who frequently stayed in the shade had average levels of 14, 19.2 and 22.8 nanograms per milliliter, respectively.

"This confirms that the issue of vitamin D supplementation is increasingly important." said Linos. She cautioned, however, against wholesale use of dietary supplements before more data has been generated; currently there are two large, randomized clinical trials testing the health effects of relatively high doses of vitamin D.

The real surprise came when Linos found that the reported use of sunscreen did not significantly affect vitamin D levels. Because sunscreens block the ultraviolet rays that trigger the vitamin's production, it seems that regular usage should lower vitamin D in the blood.

"This finding was both interesting and surprising," said Linos. The apparent contradiction is likely due to sunscreen users not using the protection effectively. "People are probably not applying it often or thickly enough," she said. "Often, people use sunscreen when they anticipate getting a lot of sun exposure, unlike others who spend time in the shade in order to avoid the sun."

Provided by Stanford University Medical Center

Citation: Caucasians who avoid sun exposure more likely to be vitamin D deficient (2011, November 3) retrieved 12 June 2026 from <https://medicalxpress.com/news/2011-11-caucasians-sun-exposure-vitamin-d.html>

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