

Vitamin D and Skin of Color: A Call to Action

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The subject of vitamin D insufficiency and deficiency recently has gained increased attention in the medical literature. Particular concerns have been raised regarding vitamin D levels in individuals with skin of color. Melanin provides at least some degree of protection from UV radiation, which impacts vitamin D production and blood levels in many individuals with skin of color.¹ Additionally, the daily use of sunscreen recommended for all patients also is commonly advised as adjunct treatment of pigmentary and collagen vascular disorders, which are common in skin of color patients, and may interfere with adequate vitamin D levels in this population.² Based on 6 key points, this editorial is a call to action for healthcare providers who treat skin of color patients to recognize possible vitamin D insufficiency and deficiency, educate patients regarding diet and supplementation, and promote the investigation of issues regarding vitamin D.

Key Point 1: Many Individuals in the United States Are Vitamin D Insufficient or Deficient

In recent years, national data have demonstrated increasing vitamin D insufficiency among the general population. Ginde et al³ evaluated the US population trends in vitamin D insufficiency by comparing serum 25-hydroxyvitamin D (25[OH]D) levels from the Third National Health and Nutrition Examination Survey (NHANES III)(1988-1994) with those from NHANES (2001-2004). The mean serum 25(OH)D level for the general population during NHANES III was 30 ng/mL (a level considered adequate) but only 24 ng/mL (a level considered to be insufficient) during the NHANES survey approximately 10 years later. Individuals with normal mean serum 25(OH)D levels of 30 ng/mL or more decreased from 45% to 23% of the population, as measured by the NHANES survey.³

Key Point 2: Vitamin D Insufficiency Considered to Be Near Universal in Black and Hispanic Populations in the United States

The NHANES (2001-2004) survey revealed that vitamin D insufficiency (21–29 ng/mL) occurred in 97% of 3149 non-Hispanic blacks and 90% of 3211 Mexican Americans. The prevalence of 25(OH)D levels less than 10 ng/mL (levels \leq 20 ng/mL indicate vitamin D deficiency) in non-Hispanic blacks increased from 9% during NHANES III to an astonishing 29% during NHANES. The prevalence of normal levels of 30 ng/mL or higher in non-Hispanic blacks decreased from 12% during NHANES III to 3% during NHANES.³

Key Point 3: Vitamin D Insufficiency May Have Implications for Disease States and Impact Known Health Disparities

Racial and ethnic differences in vitamin D levels may have important implications for known health disparities. According to Ginde et al,³ black individuals and Hispanic Americans have higher vitamin D insufficiency and higher incidence of renal and cardiovascular disease, cancers, and diabetes mellitus. In a 2006 study by Giovannucci et al,⁴ an incremental increase of serum 25(OH)D by 25 nmol/L was associated with a 45% reduction in digestive system cancer mortality, a 29% reduction in total cancer mortality, and a 17% reduction in total cancer incidence. Black men were at a higher risk for total cancer incidence and mortality than white individuals.⁴

A 2011 meta-analysis by Chung et al⁵ reviewed randomized controlled trials and observational studies reporting incidence of death from cancer and fracture outcomes. An analysis of the association between cancer and vitamin D levels in 28 observational trials showed an increased risk for total cancer mortality among men with higher baseline vitamin D concentrations but not among women. When different cancer types were individually examined, most studies found that higher vitamin D levels were associated with a lower risk for colorectal cancer. There were no relationships between vitamin D and breast or prostate cancer.⁵

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Key Point 4: Vitamin D Levels Vary in White and Black Individuals

To determine if black individuals are indeed vitamin D deficient, we must examine how physiologically normal vitamin D levels are calculated. Vitamin D levels of 30 ng/mL or more are commonly considered normal levels based on levels of which 25(OH)D maximally suppresses the parathyroid hormone. Using segmented regression, Wright et al⁶ determined that the intact parathyroid hormone appeared to stabilize at a lower 25(OH)D level in black individuals (19–23 ng/mL) compared to white individuals (>32 ng/mL), thus suggesting optimal vitamin D levels in white individuals may not be applicable to black individuals. In light of the Wright et al⁶ data, one must consider the possibility that normal levels vary between white and black individuals with levels as low as 20 ng/mL possibly representing normal levels for these individuals. Further investigation is required for individuals of African descent and Mexican Americans.

Key Point 5: Genetics and the Subsequent Heritability of Vitamin D Levels Play a Greater Role in Black Individuals

There are several genes that control the synthesis, transport, circulation, and degradation of vitamin D. A study by Signorello et al⁷ found statistically significant associations with 3 single nucleotide polymorphisms (rs2298849 and rs2282679 in the group-specific complement gene [GC] and rs10877012 in the cytochrome P450 gene [CYP27B1] and vitamin D levels but only in black individuals ($P=.008$, $P=.03$, and $P=.02$, respectively), which raises the possibility that currently defined insufficient vitamin D levels may be hereditary and perhaps may not reflect insufficient levels.⁷

Key Point 6: Guidelines for Vitamin D Supplementation That Should Be Recommended by Healthcare Providers

In light of the data demonstrating differences between vitamin D levels for white individuals and black individuals as well as the questions associated with the applicability of normal levels from one racial group to another, it is difficult to arrive at recommendations for daily vitamin D supplementation for the skin of color population. Guidelines from the Institute of Medicine suggest supplementation levels of 200 to 600 IU.⁸ However, 2010 dietary guidelines from the US Department of Agriculture⁹ and 2009 guidelines from the American Academy of Dermatology¹⁰ call for a recommended dietary intake

of 1000 IU for groups at risk for vitamin D deficiency, including dark-skinned individuals. Until additional data become available, it is prudent to support the recommendations of the US Department of Agriculture and American Academy of Dermatology.

Summary

Knowledge regarding the determination, measurement, and supplementation of vitamin D in skin of color patients is evolving. At this time, it is believed that the majority of the skin of color population in the United States is vitamin D insufficient, which is particularly concerning given the possible links to disease states. However, further supporting evidence of insufficiency is required given recent questions regarding genetics and the applicability of normal levels across racial and ethnic groups. Finally, it is important for healthcare providers treating skin of color patients to recognize, educate, and promote the investigation of issues regarding vitamin D insufficiency and deficiency.

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