Vitamin D May Protect Against Respiratory Infections

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- Low Vitamin D Linked to Increased Headache Risk
- Evidence Does Not Support Vitamin D Supplements for All
Vitamin D supplements may help reduce people’s risk of developing acute respiratory infections, particularly among those with vitamin D deficiency, suggests a new meta-analysis published online February 15 in the BMJ. However, some experts caution that these findings should not alter clinical practice, as the absolute benefit is relatively small.

"Vitamin D supplementation resulted in a statistically significant reduction in the proportion of participants experiencing at least one acute respiratory tract infection," write Adrian R. Martineau, MD, PhD, from the Queen Mary University of London, United Kingdom, and colleagues. "Patients who were very vitamin D deficient and those not receiving bolus doses experienced the most benefit."

According to the authors, acute respiratory infections are a substantial cause of illness and death, and in 2013, they accounted for one tenth of ambulatory and emergency department visits in the United States and approximately 2.65 million deaths worldwide.

Although some observational studies have linked patients’ low vitamin D levels with greater susceptibility to acute respiratory infections, including colds and influenza, clinical trials investigating the protective effect of vitamin D supplementation have produced conflicting results.

Dr Martineau and colleagues therefore conducted a systematic review and individual participant data meta-analysis of randomized controlled trials involving vitamin D supplementation. The individual participant data meta-analysis could potentially identify factors to help explain the discrepancy in results among previous studies, the authors say.

Their analysis included data on 10,933 participants (aged 0 - 95 years) from 25 randomized controlled trials. Overall, they found that vitamin D supplementation was associated with a 12% reduction in the proportion of participants who experienced at least one acute respiratory infection (adjusted odds ratio, 0.88; 95% confidence interval [CI], 0.81 - 0.96; P for heterogeneity < .001) compared with no supplementation. They also conducted subgroup analyses to explore reasons for the variable results in previous studies.

These analyses showed a protective effect of vitamin D supplementation in participants who received daily or weekly vitamin D supplements without additional large bolus doses (adjusted odds ratio, 0.81; CI, 0.72 to 0.91), but not in those who received one or more large bolus doses (adjusted odds ratio, 0.97; CI, 0.86 to 1.10; P for interaction = .05).

In addition, the protective effect was greater in participants with severe vitamin D deficiency (baseline blood 25-hydroxyvitamin D levels <25 nmol/L; adjusted odds ratio, 0.30; 95% CI, 0.17 - 0.53) than among those with baseline 25-hydroxyvitamin D levels at least 25 nmol/L (adjusted odds ratio, 0.75; 95% CI, 0.60 - 0.95; P for interaction = .006).
Vitamin D supplementation was also safe, the authors say, and did not affect the proportion of participants who experienced at least one serious adverse event of any cause (adjusted odds ratio, 0.98; CI, 0.80 - 1.20; \( P = .83 \)). "Our results add to the body of evidence supporting the introduction of public health measures such as food fortification to improve vitamin D status, particularly in settings where profound vitamin D deficiency is common," Dr Martineau and colleagues conclude.

However, in an accompanying editorial, Mark J. Bolland, MD, PhD, from the University of Auckland, New Zealand, and Alison Avenell, MD, from the University of Aberdeen, United Kingdom, question whether these findings represent a significant new development or a hypothesis that needs to be tested in adequately powered randomized controlled trials. Although the study showed that vitamin D supplementation resulted in a 12% reduction in the odds of an acute respiratory infection, the editorialists stress that these findings should be regarded cautiously. In particular, because the primary result involves only a 2% absolute risk reduction in the proportion of participants who experienced at least one acute respiratory tract infection, the editorialists do not think the general population would consider this sufficient justification to take vitamin D supplements.

Dr Bolland and Dr Avenell therefore conclude that the results should not change clinical practice. "We think that they should be viewed as hypothesis generating only, requiring confirmation in well designed, adequately powered, randomised controlled trials," they conclude.

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