

Evidence that Vitamin D Supplementation Could Reduce Risk of Influenza and COVID-19 Infections and Deaths

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Abstract

The world is in the grip of the COVID-19 pandemic. Public health measures that can reduce the risk of infection and death in addition to quarantines are desperately needed. This article reviews the roles of vitamin D in reducing the risk of respiratory tract infections, knowledge about the epidemiology of influenza and COVID-19, and how vitamin D supplementation might be a useful measure to reduce risk. Through several mechanisms, vitamin D can reduce risk of infections. Those mechanisms include inducing cathelicidins and defensins that can lower viral replication rates and reducing concentrations of pro-inflammatory cytokines that produce the inflammation that injures the lining of the lungs, leading to pneumonia, as well as increasing concentrations of anti-inflammatory cytokines. Several observational studies and clinical trials reported that vitamin D supplementation reduced the risk of influenza, whereas others did not. Evidence supporting the role of vitamin D in reducing risk of COVID-19 includes that the outbreak occurred in winter, a time when 25-hydroxyvitamin D (25(OH)D) concentrations are lowest; that the number of cases in the Southern Hemisphere near the end of summer are low; that vitamin D deficiency has been found to contribute to acute respiratory distress syndrome; and that case-fatality rates increase with age and with chronic disease comorbidity, both of which are associated with lower 25(OH)D concentration. To reduce the risk of infection, it is recommended that people at risk of influenza and/or COVID-19 consider taking 10,000 IU/d of vitamin

D₃ for a few weeks to rapidly raise 25(OH)D concentrations, followed by 5000 IU/d. The goal should be to raise 25(OH)D concentrations above 40-60 ng/mL (100-150 nmol/L). For treatment of people who become infected with COVID-19, higher vitamin D₃ doses might be useful. Randomized controlled trials and large population studies should be conducted to evaluate these recommendations.

Keywords: COVID-19; UVB; acute respiratory distress syndrome (ARDS); ascorbic acid; cathelicidin; coronavirus; cytokine storm; influenza; observational; pneumonia; prevention; respiratory tract infection; solar radiation; treatment; vitamin C; vitamin D.

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Conflict of interest statement

W.B.G receives funding from Bio-Tech Pharmacal, Inc. (Fayetteville, AR). H.L. sells vitamin D supplements. GrassrootsHealth works with various supplement suppliers to test the efficacy of their products in various custom projects. These suppliers may be listed as sponsors of GrassrootsHealth. H.P.B. has no conflicts of interest to declare.

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