

Review Suggests Need for Tailored Supplements have Vitamin D Deficiency Persists Despite Easy Access

Researchers discussed the prevalence of [vitamin D](#) deficiency despite its widespread availability through sunlight, food, and supplements, highlighting its associations with various health conditions.

The article emphasized the need for further research to establish vitamin D's beneficial effects and suggested that precision [nutrition](#) and personalized supplementation plans could effectively address individual variations in vitamin D metabolism and requirements.



Introduction

Vitamin D is crucial for vertebrates like humans. It maintains normal calcium and phosphate levels, supporting skeletal health, muscle function, [immunity](#), and cellular processes. It is found in some foods and supplements and synthesized through sunlight exposure.

In this review, researchers described how vitamin D is processed in the body, explored the advantages of ensuring sufficient levels in the [blood](#) to safeguard health, and evaluated current research on suggestions for taking vitamin D supplements.

Additionally, they discussed potential [future strategies](#) for supplementing vitamin D, proposing a personalized approach that might yield better outcomes.

How Vitamin D is Metabolized

Vitamin D is absorbed in the small intestine through passive diffusion and carrier proteins, with absorption enhanced by dietary fat. While [obesity](#) and aging do not affect absorption, obese individuals may need higher doses for optimal levels.

Sun exposure converts 7-dehydrocholesterol to vitamin D₃, which undergoes activation via hydroxylation reactions in the liver and [kidneys](#). Calcidiol, the main circulating form, is converted to calcitriol, which is considered essential for calcium absorption and bone health.

Most vitamin D comes from sunlight, and sufficient levels are vital for preventing health issues. Deficiency, indicated by low 25-hydroxyvitamin D levels, poses risks to [musculoskeletal health](#).

Health Benefits of Vitamin D

Vitamin D interacts with Vitamin D Receptors (VDRs), influencing gene transcription and immune function. VDRs, expressed on immune cells, regulate inflammation, barrier function, and [immune responses](#).

The active form, 1,25 dihydroxy vitamin D, controls various genes, impacting metabolism, immunity, and diseases like inflammatory bowel disease, diabetes, and [multiple sclerosis](#).

Vitamin D deficiency is common in [chronic obstructive pulmonary disease](#) (COPD) patients. Supplementation has shown promise in reducing exacerbation rates and improving pulmonary function and exercise, but optimal dosage and long-term effects require further investigation.

Studies suggest low vitamin D levels may increase susceptibility to respiratory infections, including [coronavirus disease 2019](#) (COVID-19), while supplementation might mitigate severity by reducing inflammation.

Vitamin D influences the immune system and expression of [angiotensin-converting enzyme 2](#), a receptor for severe acute respiratory syndrome virus 2 (SARS-CoV-2), with recommendations for higher doses to combat infections pending robust trials. However, it is not specifically endorsed for preventing or treating COVID-19.

In PCOS, low vitamin D levels are common, exacerbating symptoms such as [insulin](#) resistance and infertility. Supplementation may improve fertility outcomes.

Vitamin D deficiency is linked to fractures and reduced [bone mineral density](#). While combined calcium and vitamin D supplementation may decrease fracture risk, inconsistent findings exist.

Regarding [cancer](#), vitamin D shows potential in reducing the risk of certain malignancies by inhibiting cell proliferation and promoting differentiation. However, conclusive evidence is lacking; large-bolus dosages may not offer the same benefits.

Vitamin D's impact may extend to [mental health](#), immune system function, diabetes, and cardiovascular health. Adequate levels may alleviate depression symptoms and improve cognition in conditions like schizophrenia. However, randomized trials yielded inconsistent results.

Studies suggest that Vitamin D regulates immune response and inflammation, possibly reducing infection risk; its effects on multiple sclerosis and [Hashimoto's thyroiditis](#) are under study.

Vitamin D may improve insulin sensitivity and reduce the risk of [diabetes](#), but the evidence is inconclusive. Similarly, its role in cardiovascular disease prevention is uncertain, with some studies suggesting benefits in reducing certain risk factors.

Ensuring Sufficient Intake

Vitamin D deficiency affects half the global population and is linked to higher mortality rates. Lifestyle changes, like reduced [sunlight exposure](#), and factors like skin color and age contribute to the problem.

Deficiency leads to increased risks of bone fractures, weakened [immunity](#), diabetes, heart disease, and cancer. While some foods provide vitamin D, levels often fall short of recommended intake.

Supplementation is crucial, especially for older adults, infants, and those with darker skin or medical conditions affecting absorption. Excessive intake, however, can cause harm, particularly in cases of [hypercalcemia](#) or kidney disease.

Factors like type, dosage, quality, form, and absorption affect supplementation effectiveness. Other nutrients like calcium, magnesium, and vitamin K2 also play vital roles alongside vitamin D for overall [health](#).

Conclusion

Global evidence highlights widespread vitamin D deficiency, impacting health and mortality. While some studies show conflicting results, overall consensus supports vitamin D's benefits, including [cancer prevention](#).

Future trends suggest personalized supplementation plans based on factors like [genetics](#), lifestyle, and environment. Digital tools could aid monitoring and integration with other therapies for enhanced effectiveness.

Advances may include improved [supplement forms](#) and refined guidelines. Understanding individual needs could optimize health outcomes, but further research is needed for conclusive recommendations.

Source:

<https://www.news-medical.net/news/20240417/Vitamin-D-deficiency-persists-despite-easy-access-review-suggests-need-for-tailored-supplements.aspx>