

Vitamin D for heart health: Where the benefits begin and end

September 29 2022



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It's a workhorse nutrient that strengthens bones, supports immune function, helps the heart, and powers the body in many other ways. But recent findings about vitamin D are clear: High doses do not improve

heart and circulatory health for most adults any more than modest doses do.

"It takes only small-to-moderate amounts of vitamin D to have optimal cardiovascular function," said JoAnn E. Manson M.D., Dr.P.H., a study author and chief of the division of preventive medicine at Brigham and Women's Hospital and Harvard Medical School. "More is not better," she explained.

Through ongoing research, Manson has found that adults who take either moderate or high-dose daily vitamin D supplements of at least 1,000 IU haven't had a reduced risk for having a heart attack, stroke, or cardiovascular-related death compared to adults taking a placebo without vitamin D.

This research, which has been supported by the Vitamin D and Omega-3 Trial (VITAL), aligns with recommendations released in June by the U.S. Preventive Services Task Force, which cited insufficient evidence to recommend adults take vitamin D or any other supplement to prevent [cardiovascular disease](#).

These findings also add to mounting evidence that vitamin D supplements are not the panacea many thought they were for a host of health problems. VITAL and other randomized trials have found, for example, that higher intakes haven't [prevented cancer](#), bone fractures, or falls, nor have they alleviated knee pain, cognitive decline, or atrial fibrillation—among other conditions.

It is why researchers have begun shifting their focus to other more nuanced questions about the vitamin. For example, why do some people benefit from it more than others? Could supplements benefit specific populations, such as those with increased risks for heart disease? And given that VITAL showed high-dose vitamin D supplements reduced

risks for autoimmune conditions, could they also help reduce the severity of COVID-19?

Vitamin D: Get enough, but not too much

While researchers sort through these questions, the guidelines that have been in place for years still apply.

The National Academy of Medicine recommends a daily intake of 600 IU of vitamin D (mostly from foods) for people ages 1–70 and 800 IU for adults ages 71 and older. However, Manson notes it is reasonable for adults concerned about not getting enough vitamin D to take a daily supplement of 1,000–2,000 IU during the pandemic. She cautions against taking more. Consuming more than 4,000 IU daily, the upper daily limit, is considered mega-dosing and could lead to adverse effects, including high calcium levels in the blood or kidney stones.

So what's the best way to get vitamin D?

Getting incidental sun exposure, such as by being physically active outdoors, and eating vitamin D-rich foods, including fatty fish, fortified [dairy products](#) and cereals, and certain mushrooms, such as those exposed to ultraviolet light, are good places to start, Manson explained. Reading nutrition labels can also help people assess how much vitamin D they consume through food.

After that, supplements can provide a boost for people concerned about getting too little. Or directly exposing the skin to sunlight for 15 minutes a few times each week will get you there, too, Manson said.

But when it comes to vitamin D and the prevention of heart disease, Manson said "all you need is to get into that middle range where you're not deficient."

Understanding vitamin D and heart health

The idea that higher vitamin D intake could improve heart health emerged years ago when [observational studies](#) found people with higher blood levels of vitamin D had lower rates of cardiovascular disease.

To see if vitamin D drove this effect or was just a marker of risk, researchers conducted [randomized, controlled trials](#), including VITAL. In 2011–2013, more than 25,000 adults enrolled in VITAL, which found that high-dose vitamin D supplements did not prevent cardiovascular events. And Manson, a study director for VITAL, also conducted a meta-analysis about this topic. After reviewing [21 randomized trials](#) related to vitamin D and cardiovascular disease, she found that "not a single one showed clear benefits of vitamin D supplements in preventing heart disease or stroke."

"In observational research, correlation does not prove causation," she explained, underscoring the need for randomized, controlled trials.

Multiple factors could explain why adults with higher vitamin D levels have been less likely to have cardiovascular disease in observational studies, Manson said. Exercise is one. People who spend more time outdoors engaged in physical activity, which supports heart and vascular health, may have higher vitamin D levels from incidental sun exposure. Diet is another. Fish and other nutrient-dense meals support heart health and tend to be higher in vitamin D.

Inflammation is a third, she said. Levels of inflammation can serve as signals of disease. And since vitamin D can bind to a protein that's more likely to be depleted from inflammation, lower levels may be a marker, as opposed to a causal factor, for chronic conditions like heart disease.

However, once adults have sufficient vitamin D levels, the benefits

plateau, Manson explained. "You don't have further cardiovascular disease risk reductions with higher intake or blood levels of vitamin D."

The future of vitamin D research

Researchers, including those leading VITAL, are now turning their attention to how vitamin D supplements may help people in other ways.

Some are looking at how high-dose vitamin D supplements may support immune function in people with autoimmune conditions, including rheumatoid arthritis, lupus, and psoriasis. In this case, the [results](#) appear promising. Adults who took a [high-dose](#) vitamin D supplement for five years had a 22% reduced risk for having an autoimmune condition. Other researchers, including Manson, are [studying](#) if vitamin D can reduce the severity of COVID-19 infections, shorten recovery, and lower the risk of long COVID.

Looking at how vitamin D may help people living with type 2 diabetes and cancer are the anchors of other studies. While vitamin D supplementation hasn't prevented cancer, Manson and other VITAL researchers are studying if higher intake may slow its progression and reduce cancer-related deaths.

Alvin A. Chandra, M.D., a VITAL researcher and assistant professor in the division of cardiology at the University of Texas Southwestern Medical Center, is also curious if a parallel relationship exists with vitamin D and [heart disease](#).

"There may be subgroups of patients who are at higher risk for adverse cardiovascular outcomes who may benefit from vitamin D supplementation," he said. This could include people who have had a heart attack, stroke, or [heart](#) failure. And if there are benefits, either for vitamin D and/or omega-3 supplements, Chandra said he wants to know

what levels would provide a protective effect.

VITAL researchers are also studying mechanisms that may influence or indicate how easily vitamin D can be absorbed and used by the body. These variables may help explain why about one in every four to five Americans is at risk for having inadequate levels of vitamin D.

Darker skin color can affect skin synthesis of vitamin D from sun exposure, for instance. According to the 2011–2014 [National Health and Nutrition Examination Survey](#), about one in six Black children or adults was at risk for having a vitamin D deficiency compared to one in 13 Asian Americans, one in 17 Hispanics, and one in 40 whites. Aging, allergies, and underlying conditions, including Crohn's disease and celiac disease, can also impair absorption and have other effects, as can limited sun exposure, dietary restrictions, and extended breastfeeding.

How vitamin D interacts with other nutrients, such as magnesium and vitamin K, and impacts its absorption and biological actions are topics of other studies, Manson added. Researchers are also studying genetic links that may explain differences in how the vitamin is metabolized and binds to receptors.

The result, she explained, could lead to personalized vitamin D requirements. Particular groups that benefit most from supplementation could also be identified and helped.

"This is all part of precision prevention," she explained.

Provided by National Institutes of Health

Citation: Vitamin D for heart health: Where the benefits begin and end (2022, September 29) retrieved 1 February 2024 from

<https://medicalxpress.com/news/2022-09-vitamin-d-heart-health-benefits.html>

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