

Vitamin D supplementation linked to potential improvements in blood pressure in children

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Overweight and obese vitamin D-deficient children who took a relatively high dose of vitamin D every day for six months had lower blood pressure and improved insulin sensitivity than their peers who took a lower dose, according to the results of a UPMC Children's Hospital of Pittsburgh clinical trial reported in *The American Journal of Clinical Nutrition*.

However, the study did not show improvements in other markers of cardiovascular and [metabolic health](#), a finding that indicates [vitamin D](#) supplementation alone may not be the cure-all for improving the heart health of children at highest risk for diabetes and heart disease.

"Current recommendations for taking vitamin D are pegged to optimal bone health," said lead author Kumaravel Rajakumar, M.D., M.S., professor of pediatrics at the University of Pittsburgh School of Medicine. "But we know vitamin D is involved in more than building healthy bones. It can turn on

and off genes that direct our cells to regulate [blood glucose levels](#), and immune and vascular function."

Rajakumar and his colleagues enrolled 225 healthy, but vitamin D-deficient, 10- to 18-year-old children in Pittsburgh who were overweight or obese in the clinical trial, and 211 of them were black. People with [darker skin](#) have higher amounts of melanin pigment in their skin and are more likely than their lighter-skinned counterparts to be vitamin D deficient. This is because vitamin D is made in the body when the skin is directly exposed to sunlight, and melanin in the skin acts as a natural sunscreen and inhibits vitamin D production. Overweight and obese children also have a higher risk of vitamin D deficiency, as well as developing diabetes and [heart disease](#).

The children were split into three groups and given pills that appeared identical, but contained different quantities of vitamin D, which is measured in international units, or IUs. One group received a 600 IU tablet daily, which is the current recommended daily dietary allowance. The other two groups received either a 1,000 IU or 2,000 IU tablet daily, still well below the 4,000 IU daily maximum considered safe for children in this age range. During the trial, neither the participants, nor their doctors, knew which dose each child was receiving.

Blood tests showed that the higher the daily dose of vitamin D, the greater the improvement in the participants' blood concentration of vitamin D. By the conclusion of the trial, none of the groups was considered vitamin D deficient.

After six months, the children receiving the daily 2,000 IU vitamin D supplement had a reduced fasting blood glucose level and improved [insulin sensitivity](#)—both of which reduce susceptibility to

diabetes and improve cardiovascular health. After six months, the children receiving 1,000 IUs of vitamin D daily had [lower blood pressure](#). High blood pressure is bad because it increases risk of heart attack, stroke and kidney disease.

The study did not reveal any significant changes in measures of the health of the membrane that lines the blood vessels or arterial stiffness—both of which are strong indicators of heart health and were the primary measures that the researchers were seeking to influence with vitamin D supplementation.

"There are many reasons we might not have seen changes in endothelial function or arterial stiffness," said Rajakumar, who also is a pediatrician at UPMC Children's Hospital. "Maybe vitamin D simply doesn't influence these, or perhaps we didn't reach and maintain a level of vitamin D to cause an effect. It could also be that our trial didn't run long enough. However, treatment of vitamin D deficiency with these higher daily doses can have a positive impact on cardiometabolic health of [children](#), without negative side effects."

More information: Kumaravel Rajakumar et al, Effect of vitamin D3 supplementation on vascular and metabolic health of vitamin D–deficient overweight and obese children: a randomized clinical trial, *The American Journal of Clinical Nutrition* (2019). [DOI: 10.1093/ajcn/nqz340](https://doi.org/10.1093/ajcn/nqz340)

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