

# Vitamin D levels in the blood linked to cardiorespiratory fitness

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Sophia Antipolis, 30 October 2018: Vitamin D levels in the blood are linked to cardiorespiratory fitness, according to a study published today in the *European Journal of Preventive Cardiology*, a publication of the

European Society of Cardiology (ESC).<sup>1</sup>

"Our study shows that higher levels of vitamin D are associated with better exercise capacity," said Dr. Amr Marawan, assistant professor of internal medicine, Virginia Commonwealth University, Virginia, US.

"We also know from previous research that vitamin D has positive effects on the heart and bones. Make sure your vitamin D levels are normal to high. You can do this with diet, supplements, and a sensible amount of sun exposure."

It is well established that vitamin D is important for healthy bones, but there is increasing evidence that it plays a role in other areas of the body including the heart and muscles.

Cardiorespiratory fitness, a reliable surrogate for physical fitness, is the ability of the heart and lungs to supply oxygen to the muscles during exercise. It is best measured as the maximal oxygen consumption during exercise, referred to as VO<sub>2</sub> max. People with higher cardiorespiratory fitness are healthier and live longer.

This study investigated whether people with higher levels of vitamin D in the blood have improved cardiorespiratory fitness. The study was conducted in a representative sample of the US population aged 20-49 years using the National Health and Nutrition Survey (NHANES) in 2001-2004. Data was collected on serum vitamin D and VO<sub>2</sub> max. Participants were divided into quartiles of vitamin D levels.

Of 1,995 participants, 45% were women, 49% were white, 13% had hypertension, and 4% had diabetes. Participants in the top quartile of vitamin D had a 4.3-fold higher cardiorespiratory [fitness](#) than those in the bottom quartile. The link remained significant, with a 2.9-fold strength, after adjusting for factors that could influence the association such as age, sex, race, body mass index, smoking, hypertension, and

diabetes.

Dr. Marawan said: "The relationship between higher vitamin D levels and better exercise capacity holds in men and women, across the young and middle age groups, across ethnicities, regardless of [body mass index](#) or smoking status, and whether or not participants have hypertension or diabetes."

Each 10 nmol/L increase in vitamin D was associated with a statistically significant 0.78 mL/kg/min increase in VO<sub>2</sub> max. "This suggests that there is a dose response relationship, with each rise in vitamin D associated with a rise in exercise capacity," said Dr. Marawan.

Dr. Marawan noted that this was an observational study and it cannot be concluded that vitamin D improves [exercise capacity](#). But he added: "The association was strong, incremental, and consistent across groups. This suggests that there is a robust connection and provides further impetus for having adequate vitamin D levels, which is particularly challenging in cold, cloudy places where people are less exposed to the sun."

On the other hand, Vitamin D toxicity can lead to excess calcium in the blood, which can cause nausea, vomiting, and weakness. "It is not the case that the more vitamin D, the better," said Dr. Marawan. "Toxicity is caused by megadoses of supplements rather than diet or sun exposure, so caution is needed when taking tablets."

Regarding further research, Dr. Marawan said: "We know the optimum vitamin D levels for healthy bones but studies are required to determine how much the heart needs to function at its best. Randomised controlled trials should be conducted to examine the impact of differing amounts of vitamin D supplements on [cardiorespiratory fitness](#). From a public health perspective, research should look into whether supplementing food

products with [vitamin D](#) provides additional benefits beyond bone health."

Provided by European Society of Cardiology

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