

# Do You Know the 14 Signs of Vitamin D Deficiency?

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## STORY AT-A-GLANCE

- › Physical symptoms of vitamin D insufficiency may include aching muscles, painful bones, reduced physical performance, poor sleep, hair loss and slow-healing wounds
- › You may also experience poor sleep, fatigue, dizziness, increased risk of dementia and depression, increasing weight, recurring infections and reduced cognitive functioning
- › Vitamin D plays a role in nearly every bodily system, including fighting against viral and bacterial illnesses
- › The only way to know your serum level is to take a blood test. If you choose to supplement with vitamin D3, it's important to include magnesium and vitamin K2 MK-7 to achieve optimal levels and improve your cognitive and cardiovascular health

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Vitamin D regulates the expression of hundreds of genes and is integral to biological functions that affect every bodily system. As you'll see in this short video, vitamin D insufficiency or deficiency can trigger several generalized symptoms that you may have associated with other health conditions.

It is also called the sunshine vitamin since your skin makes vitamin D when exposed to ultraviolet light from the sun.<sup>1</sup> Vitamin D performs many functions within the body,

including maintaining adequate levels of calcium and phosphate, essential for normal bone mineralization.<sup>2</sup>

It helps reduce inflammation, which is necessary for the modulation of cell growth and immune function. Vitamin D also affects genes that help regulate cell differentiation and apoptosis.

The main indicator of your vitamin D level is 25-hydroxyvitamin D (25OHD). Data collected from the National Health and Nutrition Examination Survey in 2005-2006 showed a deficiency prevalence of 41.6% in the U.S. population.<sup>3</sup> However, as I discuss later in this article, today as many as 80% of people may be deficient in vitamin D.

It's important to note that how the measurement of insufficiency and deficiency is defined depends on the serum concentrations used. Some researchers use a level of 20 nanograms per milliliter (ng/mL) or 50 nanomoles per liter (nmol/L); the ng/mL is used most frequently in the U.S. and nmol/L is the standard in Europe.

However, GrassrootsHealth Nutrient Research Institute recommends vitamin D serum concentration levels from 40 ng/mL to 60 ng/mL or 100 nmol/L to 150 nmol/L.<sup>4</sup> At this level, the number of people who are likely deficient in vitamin D would be significantly higher.

## **14 Signs You Might Have a Vitamin D Deficiency**

During cold and flu season when respiratory illnesses are prevalent, or if you're immune-compromised and want to build up your natural defenses against other infections, it is essential to maintain healthy levels of vitamin D to help reduce your risk of viral and bacterial illness.<sup>5,6</sup> A blood test is the best way to determine your vitamin D levels, but here are some symptoms that may indicate your levels are low:

### **1. Aching muscles** – Nearly half of all adults are affected by muscle pain.<sup>7</sup>

Researchers believe most of those are deficient in vitamin D. Some studies have suggested that nerves have vitamin D receptors that affect the perception of pain.

In one animal model, research demonstrated a vitamin D-deficient diet can induce deep muscle hypersensitivity that was not connected to low levels of calcium.<sup>8</sup>

- 2. Painful bones** – Vitamin D regulates the level of calcium in your body, necessary to protect bone health.<sup>9</sup> Vitamin D deficiency can cause your bones to soften, called osteomalacia. This may be a precursor to osteoporosis.
- 3. Fatigue** – This is a common symptom of a variety of different health conditions, including sleep deprivation. Researchers have found that supplementing cancer patients suffering from fatigue can improve their symptoms.<sup>10</sup>

In one study<sup>11</sup> using 174 adults with fatigue and stable medical conditions, the researchers found 77.2% were deficient in vitamin D. After normalizing their level, the fatigue symptoms improved significantly.

- 4. Reduced muscle performance** – Vitamin D deficiency is as common in athletes as in others. Vitamin D is crucial for muscle development, strength and performance. Older adults taking a vitamin D supplement have a reduced risk of falls and improved muscle performance.<sup>12</sup>

Correction through oral supplementation or sensible sun exposure may reduce symptoms of stress fractures, musculoskeletal pain and frequent illness. Vitamin D also has a direct effect on muscle performance. In one paper from the Journal of the American Academy of Orthopaedic Surgeons, the author wrote:<sup>13</sup>

*"Higher serum levels of vitamin D are associated with reduced injury rates and improved sports performance. In a subset of the population, vitamin D appears to play a role in muscle strength, injury prevention, and sports performance."*

- 5. Brain health** – Vitamin D is also essential for your brain health. Symptoms of deficiency can include dementia caused by an increase of soluble and insoluble beta-amyloid, a factor in Alzheimer's disease.<sup>14</sup> Research has also found an association with depression<sup>15</sup> that may be associated with the function of vitamin D buffering higher levels of calcium in the brain.<sup>16</sup>

Vitamin D deficiency in pregnant women can increase the risk of autism and schizophrenic-like disorders in the baby.<sup>17</sup> One study of people with fibromyalgia found a vitamin D deficiency was more common in those who had anxiety and depression.<sup>18</sup> Another looked at vitamin D deficiency in obese subjects and found a relationship between low levels of vitamin D and depression.<sup>19</sup>

- 6. Poor sleep** — The mechanism linking vitamin D and poor sleep quality has not been identified. But research has found people with low levels of vitamin D have poor quality sleep and a higher risk of sleep disorders.<sup>20</sup>
- 7. Sweaty head** — Excessive sweating, especially on your head, or a change in your pattern of sweating, can indicate a vitamin D deficiency.<sup>21</sup>
- 8. Hair loss** — Vitamin D is crucial to the proliferation of keratinocytes and plays an important role in your hair cycle. The vitamin D receptor appears to play a role in the anagen phase of hair growth, leading researchers to conclude, "Treatments that upregulate the vitamin D receptor may be successful in treating hair disorders and are a potential area of further study."<sup>22</sup>
- 9. Slow-healing wounds** — Chronic wounds are a major public health challenge.<sup>23</sup> In the U.S. 2% of the population is affected by chronic wounds and it is estimated to account for 5.5% of the cost of health care in the U.K. NHS. Vitamin D promotes wound healing and the creation of cathelicidin, a peptide that fights wound infections.<sup>24</sup>
- 10. Dizziness** — Evidence from animal models suggests that vitamin D is critical in the development of the inner ear,<sup>25</sup> which affects balance and coordination. Analysis of people with vestibular neuritis, characterized by vertigo, showed lower serum vitamin D levels than in people without vestibular neuritis.<sup>26</sup>
- 11. Heart problems** — Clinical studies have shown that vitamin D3 improves circulation and can help improve high blood pressure.<sup>27</sup> In one study<sup>28</sup> researchers discovered that vitamin D3 also has a significant effect on the endothelial cells that line your cardiovascular system. They found that it helped balance concentrations of nitric oxide and peroxynitrite, which improved endothelial function.

**12. Excess weight** – How vitamin D affects obesity has not been identified. However, data do show there is a high probability of deficiency in people who are obese.<sup>29</sup>

**13. Recurring infections** – There have been multiple epidemiological studies that show vitamin D deficiency can increase the risk of infection and raise the severity, particularly in respiratory tract infections.<sup>30</sup> Multiple studies have demonstrated that vitamin D deficiency increases the potential risk for severe disease and mortality, especially in those who are critically ill.<sup>31</sup>

**14. Reduced cognitive function** – Data show that vitamin D deficiency increases your risk of dementia twofold<sup>32</sup> and raises your risk of impaired cognitive function.<sup>33</sup>

## **80% of People With COVID-19 Are Deficient in Vitamin D**

Vitamin D plays an important role in the development and severity of many diseases. This is why, from the very beginning of the COVID-19 pandemic, I suspected that optimizing vitamin D levels would significantly lower the incidence of infection and death in the general population.

Since then, mounting evidence has revealed that higher levels of vitamin D may reduce the rate of positive tests, hospitalizations and mortality related to this infection. One study,<sup>34</sup> released in late 2020, assessed the serum 25OHD levels of patients hospitalized with COVID-19 to evaluate the influence it might have on the severity of the disease. The researchers found 82.2% of those with COVID-19 were vitamin D deficient (levels lower than 20 ng/mL).

Interestingly, they also found those who were deficient had a greater prevalence of cardiovascular disease, high blood pressure, high iron levels and longer hospital stays. A second study<sup>35</sup> found similar results for people who only tested positive for COVID-19.

In another study published in August 2021 in the American Journal of Physiology, Endocrinology and Metabolism, data showed that the vitamin's metabolites can inhibit replication and expansion of SARS-CoV-2, the virus that causes COVID-19.<sup>36,37</sup>

It's important to remember the data showing people who are deficient in vitamin D have a higher risk of severe disease were available long before the COVID-19 pandemic. Yet, information that may suggest the other side of the same coin – namely supplementing with vitamin D – may have a positive effect on disease severity, can come under attack.

So, it isn't a big leap to understand that if simple and inexpensive solutions, such as supplementation with vitamin D, were to emerge, that, billions of dollars the pharmaceutical companies stand to make by vaccinating the world would be lost.

Unlike the painful reports of vaccine adverse events received by the U.S. Vaccine Adverse Event Reporting System (VAERS),<sup>38</sup> supplementing with vitamin D, magnesium and vitamin K2 have been studied for years and found to be "well tolerated."<sup>39,40</sup>

Added to which, the studies on vitamin D have demonstrated insufficiency and deficiency are associated with a number of health conditions.

## **Magnesium and Vitamin K2 Optimize Your Vitamin D3 Supplement**

In the past, I've written about the importance of taking vitamin K2 MK-7 and magnesium with your vitamin D3 supplement. Both play an important role in your overall health and in the bioavailability and application of vitamin D in your body. If you're not using magnesium and vitamin K2, you could need nearly 2.5 times more vitamin D, which GrassrootsHealth discovered in its D\*action project.<sup>41</sup>

Over 10,000 individuals provided information about supplement use and overall health status to GrassrootsHealth since they began conducting large-scale population-based nutrient research in 2007.<sup>42</sup>

That information has led to the recommendation that vitamin D blood levels between 40 ng/ml and 60 ng/ml (100 nmol/L to 150 nmol/L) are safe, effective and lower overall disease incidence and health care costs. As reported by GrassrootsHealth from their data:<sup>43</sup>

***"... 244% more supplemental vitamin D was needed for 50% of the population to achieve 40 ng/ml (100 nmol/L) for those not taking supplemental magnesium or vitamin K2 compared to those who usually took both supplemental magnesium and vitamin K2."***

**In practical terms, this means when you take vitamin K2 and magnesium with vitamin D, you need far less vitamin D to achieve a healthy level.**

## **Sources and References**

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