

Can This Dynamic Duo Curb Your Anxiety and Depression?

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✓ Fact Checked

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STORY AT-A-GLANCE

- › The use of magnesium and vitamin D for anxiety and depression has been trending on social media for good reason
- › Magnesium is intricately involved in psychoneuroendocrine system activity and plays a role in biological pathways associated with the development of depression
- › Magnesium supplementation has been shown to improve mild-to-moderate depression in adults, with beneficial effects occurring within two weeks of treatment, along with anxiety
- › Among older adults, those with the lowest levels of vitamin D were 11 times more likely to be depressed than those with healthy levels; low vitamin D levels are also linked to depression in children and adolescents
- › Magnesium and vitamin D deficiency are widespread; optimizing your levels may give your mental health a boost

The use of magnesium and vitamin D for anxiety and depression has been trending on social media – and this is one viral theme that’s worth paying attention to. The chatter includes anecdotal reports from long-time anxiety sufferers who say they’ve gotten relief from the natural supplements.

TikTok user Tyler Wesley, Fox News reported, posted video saying he takes 500 milligrams of magnesium and a dose of vitamin D daily, and it’s eliminated his anxiety symptoms. “I don’t have anxiety anymore. Thirty years, anxiety my whole life – I don’t

have it anymore,” he wrote.¹ But this isn't just hearsay. A wealth of research supports the use of magnesium and vitamin D to boost mental health.

Is Your Mental Health Suffering From Not Enough Magnesium?

Magnesium is necessary for the healthy functioning of most cells, especially your heart, kidneys and muscles. It's involved in the functioning of more than 300 enzymes,² and low levels of magnesium impede cellular metabolic function and deteriorate mitochondrial function.

In addition, magnesium is intricately involved in psychoneuroendocrine system activity and plays a role in biological pathways associated with the development of depression. “For example, all elements of the limbic–hypothalamus–pituitary–adrenocortical axis are sensitive to the action of Mg [magnesium],” according to a systematic review from researchers at the University of Leeds.³

Magnesium is also required for the activation of vitamin D, and deficiency may hamper your ability to convert vitamin D from sun exposure and/or oral supplementation. Unfortunately, deficiency is common and rarely diagnosed.⁴ It's estimated that 68% of Americans and 72% of French adults don't consume enough magnesium in their diet, and this inadequate intake may be linked to diseases such as high blood pressure, heart disease and Type 2 diabetes.⁵

Further, up to 30% of the population is magnesium deficient based on low serum magnesium levels, and up to 84% of certain patient populations, such as postmenopausal women with osteoporosis, are magnesium deficient when using the gold standard IV magnesium load test.⁶ Subclinical magnesium deficiency affects even more, putting mental health at risk.

Magnesium's Link to Depression and Anxiety

Magnesium is known as an antidepressant nutrient.⁷ Supplementation with this mineral has been shown to improve mild-to-moderate depression in adults, with beneficial

effects occurring within two weeks of treatment.⁸

University of Leeds research also involved data from 18 studies, revealing, “Existing evidence is suggestive of a beneficial effect of Mg on subjective anxiety.”⁹ A study published in *Medical Hypotheses* also highlights case reports showing “rapid recovery” – less than seven days – from major depression with the use of magnesium with each meal and at bedtime.¹⁰

Further, symptoms of magnesium deficiency can include many mental issues such as depression, confusion and agitation.¹¹ Individuals with depression are known to have:

- Lower magnesium levels in the blood¹² and the brain¹³
- Low cerebral spinal fluid magnesium¹⁴

As for anxiety, magnesium influences neurotransmitters in the brain in a way that may help calm your body. In addition, it helps muscles to relax and is also involved in your body’s stress response system. While low magnesium levels may increase stress, emotional and physical stress can lower magnesium in your body.¹⁵

Dr. Chris Palmer, assistant professor of psychiatry at Harvard Medical School in Boston, told Fox News:¹⁶

“Magnesium plays a role in many metabolic reactions within the body and brain. One hypothesis of anxiety disorders is that the anxiety pathways/circuits in the brain are hyperexcitable, meaning that they fire inappropriately and cause anxiety ...

Magnesium is known to reduce hyperexcitability of neurons and muscles, which is one of the reasons it is commonly included in over-the-counter muscle relaxants. This mechanism may account for its ability to reduce anxiety in some people.”

Andrew Huberman, a neuroscientist and tenured professor in the department of neurobiology at Stanford University School of Medicine, also recommends magnesium threonate as part of his “sleep stack” of supplements to improve sleep.¹⁷ Lack of sleep

may increase anxiety levels by up to 30%,^{18,19} so magnesium's ability to support a good night's rest further adds to its anti-anxiety potential.

Vitamin D for Depression and Anxiety

As with magnesium, low vitamin D levels are a prevalent health concern. The global prevalence of vitamin D deficiency (defined as a level of less than 20 ng/mL) and insufficiency (defined as a level of 20 to less than 30 ng/mL) is 40% to 100%.²⁰

The prevalence is even higher when you consider that 20 ng/mL has been shown to be grossly insufficient for good health and disease prevention, and, to maintain your health, levels below 40 ng/mL (100 nmol/L) are not recommended.

Among older adults in the U.S., vitamin D deficiency may affect up to 100% of the population,²¹ not only because they tend to spend a lot of time indoors, but also because they produce less vitamin D in response to sun exposure than a younger person with the same sun exposure.

Serotonin, the brain hormone associated with mood elevation, rises with exposure to bright light and falls with decreased sun exposure. When scientists evaluated the effects of vitamin D on the mental health of 80 elderly patients, they found those with the lowest levels of vitamin D were 11 times more likely to be depressed than those with healthy levels.²²

Researchers from Ordu University in Turkey also revealed that low vitamin D levels, along with low vitamin B12 and increased homocysteine, may play a role in depression among children and adolescents.²³

Writing in the journal *Children*, Dr. Joy Weydert of the department of pediatrics at the University of Kansas Medical Center explained, "Vitamin D deficiency decreases the expression of the enzyme catechol-O-methyl transferase (COMT), required for dopamine and serotonin metabolism."²⁴ Further, adolescents with low levels of vitamin D had improved depressive symptoms after vitamin D supplementation.²⁵

Another trial concluded that supplementing with high doses of vitamin D “seems to ameliorate [depression] symptoms indicating a possible causal relationship,”²⁶ while a Psychoneuroendocrinology study even linked low vitamin D levels with an increased risk for suicide, noting:²⁷

“Vitamin D has been proposed to act like other neurosteroids and play a role in maintaining normal brain function by modulating neuronal excitability, regulating the production of specific neurotrophins and by having neuroprotective effects ...

Active vitamin D has also been shown to increase p11 ... a protein which interacts with and transports the 5-hydroxytryptamine (5-HT)1B receptor (serotonin receptor) from the cytoplasm to the membrane ... A recent study demonstrated that p11 mRNA expression levels are lower in the stress-related brain regions of suicide victims.”

How to Optimize Your Vitamin D

There’s good reason to try natural options for anxiety and depression before resorting to medications. Antidepressants, in particular, may lead to self-harm, violence and suicide, while antianxiety drugs can be addictive and cause fatal overdoses.

The best way to optimize your vitamin D levels is via sensible sun exposure, as there are many benefits to sun exposure even aside from vitamin D. However, if this isn’t an option for you due to your location or lifestyle, daily vitamin D3 supplementation of up to 10,000 units may be needed to reach a vitamin D level of 40 to 60 ng/mL.

Data from GrassrootsHealth's D*Action studies suggest the optimal level for health and disease prevention is between 60 ng/mL and 80 ng/mL, while the cutoff for sufficiency appears to be around 40 ng/mL. In Europe, the measurements you're looking for are 150 to 200 nmol/L and 100 nmol/L, respectively.

The only way to gauge whether you might need to supplement, and how much to take, is to get your level tested, ideally twice a year – in the early spring and early fall – when

your level is at its low point and peak, respectively. Make sure that your supplemental vitamin D intake is balanced with other nutrients, including not only magnesium but also vitamin K2 and calcium.

Research by GrassrootsHealth, based on data from nearly 3,000 individuals, reveals you need 244% more oral vitamin D if you're not also taking magnesium and vitamin K2, which also works synergistically with vitamin D and helps prevent complications associated with excessive calcification in your arteries.²⁸

Why Magnesium Threonate May Be Best for Mental Health

Dark green leafy vegetables are a good source of magnesium, and juicing your greens is an excellent way to boost your intake, although supplementation may also be necessary for some people. A number of factors can affect your magnesium absorption and excretion, including alcohol consumption, prescription drugs such as statins, stress, heavy sweating and more.²⁹

In one study, the effects of magnesium supplementation were comparable to prescription antidepressants in terms of effectiveness, but without any of the side effects associated with these drugs.³⁰ Participants in the treatment group received a daily dose of 248 milligrams (mg) of elemental magnesium for six weeks, while controls received no treatment. According to the authors, "It works quickly and is well tolerated without the need for close monitoring for toxicity."³¹

When it comes to oral supplementation, my personal preference is magnesium threonate, as it appears to be the most efficient at penetrating cell membranes, including your mitochondria and blood-brain barrier.

Cerebral spinal fluid magnesium levels are tightly controlled, such that boosting blood levels of magnesium by 300% only increases cerebrospinal fluid levels by approximately 10% to 19%.³² Magnesium L-threonate, however, has improved effectiveness for increasing cerebrospinal fluid magnesium levels.³³

Only magnesium L-threonate, as opposed to magnesium chloride or magnesium gluconate, increases cerebrospinal fluid magnesium levels and improves cognition in animal models.³⁴ Magnesium is also absorbed through your skin, so you can use a topical solution or take Epsom salt (magnesium sulfate) baths to increase your levels.

The RDA for magnesium is around 310 to 420 milligrams (mg) per day depending on your age and sex,³⁵ although some researchers believe we may need as much as 600 to 900 mg/day for optimal health. I believe many may benefit from amounts as high as 1 to 2 grams (1,000 to 2,000 mg) per day.

As a general rule, I recommend starting out with a dose of 200 mg of oral magnesium citrate per day, gradually increasing your dose until you develop slightly loose stools. To use this method, you need to use magnesium citrate, as it's known for having a laxative effect. Once you know your cutoff, you can switch to other forms if you like.

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