

Vitamin B12 Deficiency Symptoms

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STORY AT-A-GLANCE

- › There is a long list of symptoms of vitamin B12 deficiency as the vitamin affects several bodily systems. They include tingling or numbness, balance or gait problems, memory loss, difficulty thinking, depression and heart palpitations
- › Groups of people with a higher risk of deficiency include older adults and people with pernicious anemia, stomach or intestinal surgery, vegetarians and vegans, and regular coffee and alcohol drinkers
- › It is easy to miss a vitamin B12 deficiency as the symptoms may mimic other conditions. Even people with serum levels within normal limits may have symptoms since you may not have enough vitamin B12 for tissue availability
- › Deficiency may be an underestimated factor in cognitive impairment and dementia; early evaluation of treatment protocols also suggest a combination of vitamins D, B12 and magnesium may lower your risk of poor COVID-19 outcomes

A significant portion of Americans have some type of vitamin deficiency, one of which is vitamin B12.¹ Vitamin B12 (cobalamin) is a water-soluble vitamin, which is vital for optimal health. Unfortunately, many of the symptoms of deficiency mimic other health conditions and so it is often considered last in a variety of health issues.

There are four known forms of the vitamin² including methylcobalamin and 5-deoxyadenosylcobalamin, which are metabolically active. Two other forms,

hydroxocobalamin and cyanocobalamin, become biologically active after they are converted.

Vitamin B12 is an essential vitamin, which means your body cannot make it. Instead, you must consume an average of 2.4 micrograms each day from food or supplements.³ While it's found in a wide variety of animal foods,⁴ some experts estimate that 3.2% of people over age 50 are deficient in vitamin B12, and another possible 20% have a borderline deficiency⁵ and others estimate that up to 43% of older adults may be deficient.⁶

Although it affects a significant number of people, particularly the elderly and those in developing countries, it is one of the most overlooked conditions.⁷ Vitamin B12 plays a vital role in many functions throughout your body. For example, it is important to create blood cells and keep nerve cells healthy.

Vitamin B12 also helps prevent **megaloblastic anemia**.⁸ The vitamin is necessary for cardiovascular and cognitive health, and it helps to produce hemoglobin, improve nerve strength and regulate homocysteine levels.^{9,10,11}

Homocysteine is an amino acid produced by the body, which in large amounts can increase the risk of heart attack and stroke. One function of vitamin B12 is to help break down homocysteine in your blood.¹² What symptoms might be a warning that you or a loved one may have a vitamin B12 deficiency?

Symptoms of Vitamin B12 Deficiency Are Not Diagnostic

The most common cause of megaloblastic anemia is a deficiency in vitamin B12.¹³ In this condition the bone marrow produces large and immature red blood cells, which leads to fatigue, lightheadedness and skin pallor. Other symptoms of vitamin B12 deficiency include:^{14,15,16,17}

Shortness of breath	Dizziness	Difficulty breathing
Loss of appetite	Tingling or numbness in	Balance or gait problems

	the hands or feet	
Loss of vision	Mental confusion	Memory loss
Depression	Insomnia	Panic attacks
Weight loss	Infertility	Dementia
Mouth or tongue soreness	Swollen or inflamed tongue	Difficulty reasoning
Joint pain	Paranoia and delusions	Incontinence
Constipation	Headache	Heart palpitations (Feeling like your heart is pounding or racing)

Infants who are deficient present with failure to thrive, megaloblastic anemia and delayed development.¹⁸ Permanent damage to the nervous system can occur, so identifying deficiency in people who don't first present with megaloblastic anemia is crucial, so it is treated as soon as possible.

Although an experienced health care provider may recognize symptoms and theorize that you have a deficiency, testing is required to confirm the condition. Certain groups of people are at greater risk of developing a **vitamin B12 deficiency** than others. These groups of people have difficulty absorbing vitamin B12 from the food they eat, or they don't get enough in their diet.¹⁹

To absorb the vitamin your body goes through a two-step process. First, hydrochloric acid in your stomach separates the vitamin from protein in the food source. Next, vitamin B12 attaches with a protein your stomach makes – called intrinsic factor – so it can be absorbed into the body.

In certain conditions, even people taking supplements cannot absorb the vitamin since they don't make enough intrinsic factor to bind with the vitamin so it can be absorbed. You may have a higher risk of developing a vitamin B12 deficiency if you are/have:^{20,21}

An older adult – Age increases the potential you don't make enough hydrochloric acid.

A regular coffee drinker – One study²² found those who drank four or more **cups of coffee** daily had lower plasma concentrations of circulating vitamin B concentrations.

A regular alcohol drinker – The effect of regular alcohol consumption was measured in healthy, well-nourished, postmenopausal women,²³ which demonstrated lower levels of vitamin B12, potentially since vitamin B12 is stored in the liver.

On certain medications – Experts recommend “Special attention should also be given to patients on medications such as **PPIs**, H2-receptor antagonists, antacids, metformin, colchicine, cholestyramine, and patients chronically on anticonvulsants or antibiotics.”²⁴

An autoimmune disease called atrophic gastritis – This condition decreases both the amount of hydrochloric acid and intrinsic factor needed to process and absorb the vitamin.

Pernicious anemia – People with this type of anemia do not make intrinsic factor. This means they cannot absorb the vitamin from supplements or their food and require vitamin B12 shots for treatment.

Stomach or intestinal surgery – For example, weight loss surgery may remove a large part of the stomach, and thus reduce the amount of hydrochloric acid and intrinsic factor to absorb vitamin B12.

Disorders of the stomach or small intestines – This includes celiac disease, Crohn's disease, tropical sprue or bacterial overgrowth.

Vegetarian or vegan – Vitamin B12 is only found naturally in animal foods such as meat, fish, dairy and eggs. Additionally, women who are strict **vegetarians** who are pregnant, or nursing do not give enough vitamin B12 to their babies.

Low Levels of B12 May Be Missed

Unless you have recognizable signs of vitamin B12 deficiency, your physician may not think to test your level. Yet, even when tested, serum norms in the U.S. may be suboptimal. Additionally, individual requirements can vary, so you may have symptoms of deficiency even when your serum levels appear to be in the normal range.²⁵

Serum levels can also be altered by the presence or absence of binding proteins. Some serum tests identify inactive forms of cobalamin, which masks deficiencies of the active form of the vitamin.

Instead, researchers recommended evaluating deficiency through the measurement of metabolites, including homocysteine, or levels of cobalamin bound to holo-transcobalamin, which more accurately represents the active form of the vitamin.

Evidence suggests that relying on serum levels of vitamin B12 can significantly underestimate tissue deficiency by as much as 50%. Serum levels may be maintained as vitamin B12 is pulled from the tissue. This means that a value above the normal cut off point does not necessarily mean you have adequate levels of vitamin B12 for your body to use.

Researchers from this study and other experts²⁶ suggest several other ways of more accurately predicting potential deficiency. One method is to look at the spectrum of **metabolic abnormalities** and clinical symptoms as compared against homocysteine and MMA levels.²⁷

B12 Deficiency May Be an Underestimated Cause of Dementia

Some of the symptoms of vitamin B12 deficiency are mental health disorders, including depression. One study²⁸ of 89 children and adolescents with depression found those who are depressed had “clearly low” levels of vitamin B12 and vitamin D and their homocysteine levels were “remarkably high.”

Another study²⁹ engaged 199 depressed adults who received vitamin B12 supplementation with antidepressants and exhibited significantly improved symptoms. In addition to depression, low levels of vitamin B12 have been associated with minimal cognitive impairment and dementia and may be an option to improve patient outcomes.³⁰

One study³¹ characterized the cognitive pattern of elderly adults who had vitamin B12 deficiency and compared it against those who had **Alzheimer's disease**. Their results suggested a distinctly different pattern in both diseases.

The researchers found that of the 19 individuals who had low levels of vitamin B12, 12 improved with treatment and seven continued to deteriorate. The researchers went on to analyze the initial neuropsychological evaluation of the two groups of patients and found there was a different profile in those who had a form of **dementia** that responded to vitamin B12 supplementation and those who did not.

In the group who responded to B12 supplementation there were initially more psychotic problems and a greater number of deficits in executive functioning and concentration. In the group who did not respond to supplementation there were greater problems with language and apraxia.

The scientists discovered memory pattern challenges were also different, leading them to believe that vitamin B12 deficiency may be differentiated from Alzheimer's disease with a thorough psychological evaluation.³²

Scientists recognize that the hematological and neuropsychiatric effects of vitamin B12 deficiency may not occur systematically. The true incidence of neuropsychiatric symptoms is unknown. However, depending on the population being studied and the definition of vitamin B12 deficiency used by the researchers, the rate can vary between 4% and 50%.³³

Testing for Vitamin B12 Deficiency With Cognitive Decline

As early as 2009, Dr. Ronald Devere, then-director of the taste and smell disorders clinic and Alzheimer's disease and memory disorders center in Austin, Texas, recommended guidelines for evaluating vitamin B12, folate, MMA and homocysteine blood levels to discern those who may respond to vitamin B12 or folate supplementation to reduce cognitive impairment.³⁴

He recommended continuing to use vitamin B12 and folate serum levels in those who present with changes in cognitive functioning. In addition, he set limits for measuring MMA and homocysteine to determine if serum vitamin B12 was an accurate reflection of the vitamin level.

In one paper³⁵ published in the Journal of Neuropsychiatry, the scientists recognized only one-third of individuals with low levels of vitamin B12 receive adequate supplementation. The researchers warned that in the early phases of replacement therapy in patients who have megaloblastic anemia, clinicians should watch for falling potassium levels that may result in early death.

Administering **folate** in conjunction with vitamin B12 supplementation may help partially correct megaloblastic anemia. On the other hand, they suggest it could aggravate encephalopathy that may be present with vitamin B12 deficiency.

The doctors suggest that the devastating impact of dementia on the individual and their family warrants testing for vitamin B12 deficiency and potentially supplementation, since deficiency in the elderly is a common condition and modern diagnostic tools in addition to neurophysiological parameters may help improve cognitive performance.

B Vitamins May Help Prevent the Worst COVID Outcomes

Vitamin B12 belongs to a complex of **B vitamins** which researchers' postulate may significantly improve COVID-19 outcomes. One cohort study^{36,37} of 43 patients diagnosed with COVID-19 admitted to the Singapore General Hospital in early 2020

analyzed the oral administration of vitamin D3, magnesium and vitamin B12, collectively called DMB, against a control group who did not receive DMB therapy.

The researchers found that only 17.6% required oxygen therapy during hospitalization as compared to 61.5% of those in the control group. Of the patients who required oxygen in the DMB group, two were admitted to ICU and one was not. Of the control group that required supplemental oxygen, all were admitted to the ICU.

The B vitamins play a significant role in a healthy functioning immune system. Additionally, the same group of vitamins play a role in reducing the severe effects of COVID-19,³⁸ including roles in viral replication, cytokines storm induction, adaptive immunity and hypercoagulability.

In one paper³⁹ published in the journal Maturitas, scientists detailed the various routes that each of the B vitamin may affect in the management of COVID-19 symptoms. Specifically for vitamin B12, a deficiency can increase an inflammatory response and raise homocysteine levels.

These actions may trigger endothelial dysfunction and activate a platelet and coagulation cascade that can potentially lead to blood clots. For further explanation see [“B Vitamins Might Help Prevent Worst COVID-19 Outcomes.”](#)

Vitamin B12 is found almost exclusively in animal tissue. This includes foods like beef, lamb, venison, poultry, eggs and dairy products. Nutritional yeast is high in B12 and recommended for vegetarians and vegans. Two tablespoons provide 7.8 micrograms.⁴⁰

A sublingual under the tongue fine mist spray or vitamin B12 injections are also effective as they allow the large molecule to be absorbed directly into your bloodstream and bypasses the need for hydrochloric acid and intrinsic factor.

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