

What Are the Signs of Vitamin B Complex Deficiency?

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✓ Fact Checked

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STORY AT-A-GLANCE

- › A deficiency in B vitamins may lead to respiratory conditions, dementia, psychiatric symptoms and blood disorders
- › Some groups experience a greater risk of B vitamin deficiency, such as the elderly, those exposed to pesticides, individuals taking proton pump inhibitors, those who drink large amounts of alcohol or who have an autoimmune disease
- › B vitamins help your body detoxify from air pollution, which causes serious damage to your lungs, heart and other organ systems; folate may also help reduce the incidence of neural tube defects in infants and prevent the development of autism and schizophrenia
- › While the terms folate and folic acid are often used interchangeably, they are not identical; folic acid may trigger liver damage comparable to the damage produced by glyphosate

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Traditional media often run stories about how supplements may cause problems. One of the problems with studies highlighting supplements is they typically use synthetic vitamins, and not whole food supplements. Your body was not made to process unnatural agents, often posing as equivalents to the real thing. The reality is they are frequently not the same and do not provide you with the same health benefits.

Vitamin deficiencies may lead to illness and disease, and contribute to chronic issues such as high blood pressure, dementia and cancer. One nutritional deficiency having the

potential to wreak havoc on your health, your cognition and even your respiratory system is a deficiency in vitamin B complex. B vitamins also help your body to detoxify from chronic exposure to pollutants and chemicals.

Elderly Have Higher Rates of Deficiency

A large population study conducted in Ireland¹ discovered a larger than expected number of adults over age 50 with vitamin B12 and folate deficiencies. Researchers from Trinity College Dublin² analyzed information from over 5,000 adults to establish a general level of vitamin B12 and folate in a mature population.

Public health policies in many countries have suggested supplementing processed foods with folic acid and vitamin B12 may ensure the population at large has access to these nutrients. However, the present findings³ suggest official health policies may not be sufficient. The researchers noted both folate and vitamin B12 are crucial to brain health, red blood cell production, and synthesis and repair of DNA and nerve functions.⁴

The data revealed as many as 1 in 8 older adults has low levels of vitamin B12 or a B12 deficiency, and 1 in 7 has low or deficient folate levels. As the age of the participants increased, the prevalence of inadequate folate levels seemed to increase. Percentages rose from 14% in people up to 60 years, rising to 23% in participants older than 80.⁵

Past studies have linked poor long-term health, especially in older adults, to low nutritional levels of folate and vitamin B12. The high rates of deficiency seen in older populations are cause for concern. Dr. Rose Anne Kenny, principal investigator in the study,⁶ believes since these deficiencies may be treated with food fortification, significant policy and practice implications are suggested for government and health services.

Fortification of food products in Ireland is voluntary, but some foods are enriched with micronutrients such as folic acid. In the U.S., folic acid fortification is mandatory, yet an estimated 3.2% of adults over 50 continue to demonstrate deficiency and another 20% have borderline deficient levels of vitamin B12, according to the National Health and

Nutrition Examination Survey (NHANES) by the Centers for Disease Control and Prevention (CDC).⁷

B Vitamin Deficiencies Are Dangerous to Your Health

Vitamin B deficiencies are linked with a number of health concerns. B12 deficiency is a known cause for central and peripheral nervous system damage. One study demonstrated deficiency increased the prevalence of laryngeal hyper-responsiveness and subsequently lowered cough thresholds.

After B12 supplements were given, patients found their symptoms significantly improved. According to the study,⁸ the results suggest a deficiency may contribute to chronic cough by favoring sensory neuropathy.

Central nervous system disorders are also associated with a deficiency in vitamin B, including dementia and Alzheimer's. In the U.S., Alzheimer's disease is at epidemic proportions, with 5.4 million Americans living with the disease and the number expected to jump to 16 million by 2050. In a study published in PNAS,⁹ researchers found vitamins B6, B12 and folic acid may help slow the progression of Alzheimer's disease, confirming and supporting previous studies.

All of the 156 study participants were over the age of 70 and diagnosed with mild cognitive impairment. One group received a placebo and the other high-dose vitamin B supplementation consisting of B6, B12 and folic acid.¹⁰ The treatment demonstrated an effective slowing of the shrinkage of the whole brain volume over two years and reduced cerebral atrophy in brain regions particularly vulnerable to damage by Alzheimer's.

Psychiatric conditions also respond significantly to vitamin B supplementation. Research has demonstrated it reduces symptoms associated with schizophrenia more so than standard drug treatments alone.¹¹ When used together with antipsychotics, vitamin B supplements may restore nutritional deficits, reduce oxidative stress and modulate neurological pathways that exacerbate symptoms of psychiatric illness.

The late Dr. Abram Hoffer was a leading niacin researcher and world authority on the therapeutic use of niacin.¹² He found certain people have what he termed a niacin dependency. This means they need far more niacin on a regular basis than normal and are essentially dependent in order to remain well.

This appears to be the case in some suffering specific disorders, including attention deficit disorder, anxiety, depression, obsessive compulsive disorder and general psychosis; deficiency may trigger mania, psychosis and paranoid delusions. Vitamin B deficiencies are also associated with:

Fatigue	Weakness
Anemia	Skin infections
Nausea	Mental confusion
Digestive issues	Nerve problems (numbness, tingling, trouble walking) ¹³

Groups More at Risk for B Complex Vitamin Deficiencies

While B12 is easily obtained from animal proteins such as meat, fish, milk and cheese, advancing age may diminish your ability to absorb the vitamin from food.¹⁴ Absorption depends on adequate stomach acid, pepsin and gastric intrinsic factor.

Insufficient amounts of acid may also be present if you use acid blockers for heartburn. Individuals who regularly use a proton pump inhibitor may develop a B12 deficiency.¹⁵ Excessive intake of alcohol may result in reduced absorption rates as well.

Individuals who suffer other stomach or small intestine disorders, such as celiac or Crohn's disease, may be unable to absorb vitamin B12 from their food.¹⁶ Those who have had surgical procedures in their gastrointestinal tract for weight loss or procedures resulting in removal of all or part of the stomach may also be at risk.

Individuals who practice strict vegetarianism or are vegans are at greater risk than those who are lacto-ovo vegetarians, as natural food sources are limited to animal-based foods.

The B-group of vitamins is a collection of eight water-soluble vitamins,¹⁷ which are unable to be stored by the body and must be consumed regularly in your diet. Extended cooking times or food processing can destroy or reduce the availability of many of the B vitamins. In the featured study from Ireland, low or deficient vitamin B12 was more commonly found in smokers, those who lived alone and those from lower socioeconomic backgrounds.¹⁸

There are also groups of people who have an increased requirement, such as women who are pregnant or breastfeeding, those who have an autoimmune disorder or people with HIV infections. Frank vitamin B6 deficiency is relatively rare in the U.S., but some suffer from subclinical deficiency or suboptimal levels. People with poor renal function, autoimmune disorders such as rheumatoid arthritis or those who are alcohol dependent have greater difficulty in absorbing vitamin B6.¹⁹

Detoxify From Chronic Air Pollution

Chronic exposure to pesticides and **air pollution** may help deplete vitamin B complex. Adequate amounts of all eight vitamins are necessary to aid in your body's nutritional demands during detoxification.²⁰ According to the World Health Organization,²¹ 92% of people worldwide breathe polluted air and live in toxic environments responsible for at least 1 in 4 deaths reported worldwide.

Poor air quality causes serious damage to your lungs, heart and other organ systems. However, maintaining optimal levels of vitamin B complex may help to offset your exposure to toxic air pollution.²² In a study published in PNAS,²³ researchers recruited 10 volunteers between 18 and 60 years of age. The participants were exposed to clean air and given a placebo to establish a baseline.

During the next round of testing, they inhaled concentrated smog for two hours, after which blood samples were collected. Next, participants received daily supplements of 2.5 milligrams (mg) of folic acid, 50 mg of vitamin B6 and 1 mg of vitamin B12 for four weeks before inhaling hazardous levels of fine particulate matter (PM 2.5) air pollution.

It is important to note the dosages used during the study were higher than those recommended by the Institute of Medicine. However, this was not the first time higher than normal doses of vitamin B vitamins have shown distinct health benefits.

Following four weeks of supplementation the participants experienced a reduction in genetic damage in 10 gene locations, protected **mitochondrial DNA** from harmful effects and reparation of some of the genetic damage caused by the pollution.²⁴

Benefits to Maintaining Optimal Levels of B Vitamins

Folate (vitamin B9) is one of the B vitamins needed to produce red and white blood cells in your bone marrow and to convert carbohydrates into energy. Although your body is capable of making folate in your gut,²⁵ it requires specific probiotic bacteria, which may not currently populate your gut microbiome. Adequate amounts of folate are extremely important during periods of rapid growth, such as during infancy, adolescence and pregnancy.

For this reason, in the 1990s the U.S. mandated grain-based foods to be fortified with folic acid to help prevent neural tube defects in infants born to mothers who may not have consumed enough folate.²⁶ Neural tube defects are complex congenital malformations that result when the neural tube closure during embryogenesis fails.

Although supplementation with folic acid has demonstrated a decrease in the prevalence of neural tube defects,^{27,28} other lines of evidence have suggested B12, choline and methylation metabolism are also involved.²⁹

Optimal levels of vitamin B9 may also deter the development of psychosis and autism in children. In one study, researchers compared school-age children born before the fortification mandate against young people born after, finding an increase in utero folic

acid exposure was associated with changes in later brain development, which in turn predicted a reduced risk for symptoms of psychosis.³⁰

The team from Massachusetts General Hospital³¹ reviewed two sets of brain images taken between ages 8 and 18, revealing those born after full implementation of folic acid fortification had different patterns of cortical maturation. These differences were characterized by significantly thicker brain tissue and delayed thinning of the cerebral cortex, regions associated with the development of schizophrenia.

Folate may also mitigate the risk of pesticide-induced autism. As glyphosate disrupts your gut microbiome, it may lead to a decreased ability to produce folate and induce folate deficiency. Research by UC Davis finds taking a recommended amount of folic acid at the time of conception may lower your child's risk of pesticide-related autism. In a press release, researchers wrote:³²

"In the study, children whose mothers took 800 or more micrograms of folic acid (the amount in most prenatal vitamins) had a significantly lower risk of developing autism spectrum disorder (ASD) – even when their mothers were exposed to household or agricultural pesticides associated with increased risk.

Mothers who took less than 800 micrograms and encountered household pesticides had a much higher estimated risk of having a child who developed an ASD than moms who took 800 micrograms of folic acid or more and were not exposed to pesticides. The associated risk increased for women exposed repeatedly.

Women with low folic acid intake who were exposed to agricultural pesticides during a window from three months before conception to three months afterward also were at higher estimated risk."

Folate or Folic Acid?

While the terms folate and folic acid are often used interchangeably, it is important to realize there are significant differences between them. Massachusetts Institute of

Technology research scientist Stephanie Seneff, Ph.D., writes in a Weston A. Price article about the differences between the two:³³

"The folic acid supplement that's added to flour is a synthetic version of the B vitamin, which is oxidized and missing the methyl group. The active form of the vitamin is technically called methyltetrahydrofolate. Folic acid is much more stable, whereas folate easily breaks down with aging or with heat ... Folic acid is a (cheaper) synthetic molecule whereas folate is natural.

A definitive study from 1991 involving 33 centers in seven countries seemed to support the decision, suggesting a clear benefit from folic acid supplementation with little down side.

A bold assumption in supplementing with folic acid rather than folate was that the gut microbes would take care of reducing folic acid to folate (adding two hydrogen atoms and reducing double bonds) and then adding the all-important methyl group, prior to its absorption into the bloodstream. If this doesn't happen, the folic acid is useless, and may even have toxic effects.

A much more recent study, from 2014, suggests that this assumption was wrong. Through direct measurements of folic acid metabolites in the hepatic portal vein, they discovered that the human gut can methylate folate but it can't efficiently reduce folic acid, a step that is necessary prior to methylation.

This means that the unreduced and unmethylated folic acid makes its way to the liver, which then is tasked with both reducing it and methylating it.

This costs the liver dearly, both in antioxidant capacity and in methylation capacity. In fact, it can be expected to drive the liver toward a hyperoxidized state, with a high ratio of oxidized-to-reduced glutathione and a depletion of an important compound called nicotinamide adenine dinucleotide phosphate (NADPH) and methionine, all of which lead to liver stress. Unfortunately, glyphosate does all of these things in the liver as well."

Find These Valuable Nutrients in Your Food

As a rule, I recommend getting most, if not all, of your nutrition from real food. Ideally, this is from organically raised foods to avoid exposure to toxic pesticides. Depending upon your situation and condition however, you may need one or more supplements.

If you find you rarely or never eat foods rich in one of these nutrients you may want to consider using a high-quality, ideally food-based supplement. Consider limiting your sugar intake and incorporating fermented foods to help improve your absorption and reduce damage to your mitochondria and metabolism.

As the entire B group of vitamins is produced within your gut, it is important to eat fermented foods and organically grown whole food to provide your microbiome with important fiber and beneficial bacteria to optimize your internal vitamin B production.

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