

Is Vitamin B12 Deficiency the Hidden Epidemic?

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What is vitamin B12?

Vitamin B12, also known as cobalamin due to the presence of the mineral cobalt, is a vital water-soluble vitamin necessary for numerous bodily functions. There are several forms of vitamin B12, each with slightly different chemical structures, including cyanocobalamin (CNCbl), hydroxocobalamin, methylcobalamin (MeCbl), and adenosylcobalamin (AdoCbl). When selecting a vitamin B12 supplement, you'll find that these products can contain any one of these forms.

Currently, cyanocobalamin is the most frequently used form of vitamin B12 in dietary supplements. However, adenosylcobalamin, methylcobalamin, and hydroxycobalamin are also available in supplement form. To cater to different preferences and needs, vitamin B12 supplements come in various formulations, such as oral tablets that are swallowed, sublingual tablets that dissolve under the tongue, injectable solutions, and nasal sprays. Furthermore, a vitamin supplement might be a single-ingredient product containing only vitamin B12, or it could be a more comprehensive multivitamin and mineral formulation.

Why does our body need vitamin B12?

Vitamin B12 is a really vital nutrient that plays several crucial roles in keeping us healthy. Specifically, Vitamin B12 is essential for the production of healthy red blood cells, which carry oxygen throughout our bodies. It's also involved in DNA synthesis, which is the process of creating new cells. Furthermore, it plays a key role in our energy metabolism, helping us convert food into energy, and in the proper functioning of our brain and nerves.

Because of all these functions, Vitamin B12 is really required for healthy growth and for maintaining optimal health overall. Ensuring we get enough of this vitamin is important for our well-being.

Which foods are good sources of vitamin B12?

Like all vitamins, the body is unable to make vitamin B12, and it is primarily obtained from food intake. Vitamin B12 is predominantly found in animal-based foods. Foods that are high in vitamin B12 ($\mu\text{g}/100\text{g}$) include: liver

(26–58), beef and lamb meat (1–3), chicken (trace-1), eggs (1–2.5), and dairy foods (0.3–2.4). Plant foods typically do not contain substantial amounts of vitamin B12.

What is the recommended daily intake of vitamin B12?

The RDA (Recommended Dietary Allowance) for vitamin B12 is 2.4 micrograms per day for adolescents and adults. It is slightly higher for women who are pregnant (2.6 mcg/day) or breastfeeding (2.8 mcg/day). To maintain sufficient levels of vitamin B12 and prevent deficiency, it is advisable to consume 2.4 mcg daily.

How do I know whether I need to take a vitamin B12 supplement or not?

It is estimated that about 75 per cent of the Indian population has a B12 deficiency. Vegetarians, the elderly, children, pregnant and lactating women, chronic alcoholics, and individuals with certain gut disorders are at a greater risk of developing vitamin B12 deficiency. If you have any of the following complaints, you may have had vitamin B12 deficiency:

- Generalised weakness, tiredness
- Pale skin and nails
- Tongue pallor or soreness
- Loss of appetite and constipation
- Numbness and tingling of the feet and hands
- Difficulty in walking, maintaining balance
- Mood changes, memory loss, disorientation, and dementia

How can one find out if there is a lack of vitamin B12 in the body?

To find out, whether one requires to take a vitamin B12 supplement or not, the following blood tests are carried out:

- Serum vitamin B12 level
- Serum methylmalonic acid (MMA) level
- Serum Homocysteine level
- Serum Holotranscobalamin (HoloTC), level

Depending upon the results of the above-mentioned tests, doctors can confirm the diagnosis of deficiency of vitamin B12. Clinical laboratories define vitamin B12 deficiency at a vitamin B12 level of less than 150 pg per ml (110.67 pmol per L), or in some cases, 200 pg per ml.

How is vitamin B12 deficiency treated?

To prevent or treat vitamin B12 deficiency, one must consume a healthy and well-balanced diet. If you are having a deficiency of vitamin B12, your doctor may prescribe you either oral tablets or injections containing vitamin B12.

These tablets/injections may contain only vitamin B12, or they may also contain other vitamins and minerals, along with vitamin B12.

The exact dose and duration of taking a vitamin B12 supplement will vary from individual to individual, depending on the disease condition and its severity. Please follow the advice of your doctor.

Are there any side effects of vitamin B12 supplements?

Vitamin B12 has been demonstrated to be safe in doses up to 1,000 times the recommended dietary allowance of 2.4 mcg and is also safe in pregnancy. Even at large doses, vitamin B12 is generally considered to be safe, because the body does not store excess amounts. Occasional patients may develop giddiness, itching, skin rash, or nausea after receiving vitamin B12 injections.

Is vitamin B12 harmful in overdose?

No. Vitamin B-12 administered in supra-physiological doses, either orally or by intramuscular injections, has so far not been found to be toxic. No adverse effects or any toxicity have been associated with large intakes of vitamin B12 from food or supplements in healthy people. Vitamin B12 is a water-soluble vitamin. If a person consumes high doses, the excess amount is excreted in urine. Even when high doses of vitamin B12 are given orally, only a small percentage can be absorbed, which may explain its low toxicity. Because of the low toxicity of vitamin B12, no tolerable upper intake level (UL) has been set by the US Food and Nutrition Board.

Very high doses, as high as 2 mg (2,000 µg) daily by mouth or 1 mg monthly by intramuscular (IM) injection, have been used to treat pernicious anaemia without significant side effects. Some studies have raised concern over the potential toxicity of high-dose cyanocobalamin supplements in individuals with impaired kidney function, probably due to the accumulation of cyanide. In individuals with kidney disease, it is advisable to use methylcobalamin, instead of cyanocobalamin.

What things should one keep in mind before starting any vitamin supplements?

- A healthy and balanced diet usually provides all the vitamins and minerals required by the body.
- Always consult your doctor before taking any vitamin supplement on your own.
- Inform your doctor about different medical conditions you have and what other medicines you are taking for them.
- Know the contents of the vitamin supplements you are taking. Different vitamin supplements contain different vitamins and minerals, and in different amounts.
- Take the vitamin supplement only as advised by your doctor.
- Please ask your doctor what dose and for how long you have to take the vitamin supplement.
- Please inform your doctor immediately, if you notice any unwanted side effects after taking a vitamin supplement.



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