Vitamin D Deficiency

Vitamin D is a vitamin and, like all vitamins, it is essential for our health and well-being. Vitamin D is mostly made in the skin by exposure to sunlight.

Most foods contain very little vitamin D naturally. Foods that naturally contain vitamin D include:

- Oily fish (such as sardines, pilchards, herring, trout, tuna, salmon and mackerel).
- Egg yolk, red meat and liver.

Some foods are fortified with vitamin D (this means they have vitamin D added to them). These foods include infant formula milk, most margarines and some cereals. All milk is fortified with vitamin D in some countries but not in the UK.

Vitamin D deficiency symptoms

Many people have no symptoms, or may complain of only vague ones such as tiredness or general aches. Because symptoms of vitamin D deficiency are often very nonspecific or vague, the problem is often missed. The diagnosis is more easily reached in severe deficiencies with some of the classical (typical) symptoms and bone deformities.

Symptoms in babies

Babies with severe vitamin D deficiency can get cramps (muscle spasms), fits (seizures) and breathing (respiratory) difficulties. These problems are related to consequent low levels of calcium.

Symptoms in children

- Children with severe deficiency may have soft skull or leg bones. Their legs may look curved (bow-legged). They may also complain of bone pains, often in the legs, and muscle pains or muscle weakness. This condition is known as rickets.
- Poor growth. Height is usually affected more than weight. Affected children might be reluctant to start walking.
- Tooth delay. Children with vitamin D deficiency may be late teething, as the development of the milk teeth has been affected.
- Irritability in children can be due to vitamin D deficiency.
- Children with vitamin D deficiency are more prone to infections. Breathing symptoms can occur in severe cases. Breathing can be affected because of weak chest muscles and a soft rib cage.
- When rickets is very severe, it can cause low levels of calcium in the blood. This can lead to muscle cramps, fits and breathing difficulties. These need urgent hospital treatment.
- Rarely, an extremely low vitamin D level can cause weakness of the heart muscle (cardiomyopathy).

Symptoms in adults

- Some people complain of a general tiredness, vague aches and pains and a general sense of not being well.
- In more severe deficiency (known as osteomalacia), there may be more severe pain and also weakness. Muscle weakness may cause difficulty in climbing stairs or getting up from the floor or a low chair, or can lead to the person walking with a waddling pattern.
- Bones can feel painful to moderate pressure (often more noticeable in the ribs or shin bones). Not uncommonly, people have a hairline fracture in the bone which is causing tenderness and pain. Bone pain often also occurs in the lower back, hips, pelvis, thighs and feet.

Who gets vitamin D deficiency?

Vitamin D deficiency means that there is not enough vitamin D in your body. This may be because:

- Your body has an increased need for vitamin D.
- Your body is unable to make enough vitamin D.
- You don’t have enough vitamin D in your diet.

You have an increased need for vitamin D

Growing children, pregnant women, and breast-feeding women need extra vitamin D because it is required for growth. So, vitamin D deficiency is more likely to develop in the following groups of people:

- Pregnant or breastfeeding women. Vitamin D deficiency is even more likely to develop in women who have had several babies with short gaps between pregnancies.
- Breast-fed babies whose mothers are lacking in vitamin D, or with prolonged breastfeeding, as there is little vitamin D in breast milk.
Your body is unable to make enough vitamin D
This can occur for various reasons:

- People who get very little sunlight on their skin are at risk of vitamin D deficiency. This is more of a problem in the more northerly parts of the world (including the UK) where there is less sun. In particular:
  - People who stay inside a lot. For example, those in hospital for a long time, or housebound people.
  - People who cover up a lot of their body when outside.
  - The strict use of sunscreen may increase the risk of vitamin D deficiency, particularly if high sun protection factor (SPF) creams (factor 15 or above) are used. However, there is no evidence that the normal use of sunscreen does actually cause vitamin D deficiency in real life. Everyone, especially children, should always be protected from the harmful effect of the sun's rays. See separate leaflet called Sun and Health for more information.

- Elderly people are unable to produce as much vitamin D. This leaves older people more at risk of vitamin D deficiency.
- People who have darker skin are not able to make as much vitamin D.
- Some medical conditions can affect the way the body handles vitamin D. People with Crohn's disease, coeliac disease, and some types of liver and kidney disease, are all at risk of vitamin D deficiency.
- Rarely, some people without any other risk factors or diseases become deficient in vitamin D. It is not clear why this occurs. It may be due to a subtle metabolic problem in the way vitamin D is made or absorbed. So, even some otherwise healthy, fair-skinned people who get enough sun exposure can become deficient in vitamin D.
- Vitamin D deficiency can also occur in people taking certain medicines. Examples include: carbamazepine, phenytoin, primidone, barbiturates and some anti-HIV medicines.

Not enough dietary vitamin D
Vitamin D deficiency is more likely to occur in people who follow a strict vegetarian or vegan diet, or a non-fish-eating diet.

How common is vitamin D deficiency?
A lack of vitamin D is very common. One survey in the UK showed that about 1 in 5 adults and about 1 in 5 children in the UK have low vitamin D levels. More people have low vitamin D levels in the winter and spring because of less exposure to sunlight.

How is vitamin D deficiency diagnosed?
It may be suspected from your medical history, symptoms, or lifestyle. A simple blood test for vitamin D level can make the diagnosis. Blood tests for calcium and phosphate levels and liver function may also show changes linked to a low level of vitamin D. Sometimes a wrist X-ray is done for a child in order to see how the bones are developing. This can assess how severe the problem is by looking for changes in the wrist bones.

Vitamin D deficiency treatment
The treatment is to take vitamin D supplements. This is a form of vitamin D called ergocalciferol or calciferol. Vitamin D can be given as an injection or as a medicine (liquid or tablets). Your doctor will discuss the dose and the best treatment schedule, depending on your situation, age, severity of the deficiency, etc. Briefly, one of the following may be advised.

Injection
A single small injection of vitamin D will last for about six months. This is a very effective and convenient treatment. It is useful for people who do not like taking medicines by mouth, or who are likely to forget to take their tablets.

High-dose tablets or liquids
There are different strengths available and a dose may be taken either daily, weekly or monthly. This will depend on your situation and on which particular treatment guideline your doctor is using. With high doses of vitamin D it is even more important to take the medicine correctly. The advantage of the higher-dose treatment is that the deficiency improves quickly, which is very important in growing children.

Standard-dose tablets, powders or liquids
These are taken every day for about 12 months so that the body can catch up on the missing vitamin D. This is a rather slow method of replacing vitamin D, but is suitable if the deficiency is mild, or for prevention.

Maintenance therapy after deficiency has been treated
Once vitamin D deficiency has been treated, the body's stores of vitamin D have been replenished. After this, maintenance treatment is often needed long-term, to prevent further deficiency in the future. This is because it is unlikely that any risk factor for vitamin D deficiency in the first place will have completely resolved. The dose needed for maintenance may be lower than that needed to treat the deficiency.

Are there any risks to taking vitamin D supplements?
Care is needed with vitamin D supplements in certain situations:
Further reading & references

- Denosumab for the prevention of osteoporotic fractures in postmenopausal women; NICE Technology Appraisal Guidance, October 2010
- Osteoporosis: assessing the risk of fragility fracture; NICE Clinical Guideline (August 2012, updated February 2017)
- Management of osteoporosis and the prevention of fragility fractures - A national clinical guideline; Scottish Intercollegiate Guidelines Network - SIGN, (March 2015)
- Guideline for the diagnosis and management of osteoporosis in postmenopausal women and men from the age of 50 years in the UK; National Osteoporosis Guideline Group (updated 2014)
- Clinical guideline for the prevention and treatment of osteoporosis; National Osteoporosis Guideline group (NOGG) 2017
- Bisphosphonates for treating osteoporosis; NICE Technology Appraisal Guidance, August 2017
- Hip fracture: management; NICE Guideline (June 2011, updated May 2017)
- Management of hip fracture in older people; Scottish Intercollegiate Guidelines Network - SIGN (June 2009)
Disclaimer: This article is for information only and should not be used for the diagnosis or treatment of medical conditions. Patient Platform Limited has used all reasonable care in compiling the information but makes no warranty as to its accuracy. Consult a doctor or other healthcare professional for diagnosis and treatment of medical conditions. For details see our conditions.

View this article online at: patient.info/vitamin-d-deficiency

Discuss Vitamin D Deficiency and find more trusted resources at Patient.

Ask your doctor about Patient Access

- Book appointments
- Order repeat prescriptions
- View your medical record
- Create a personal health record (iOS only)

Simple, quick and convenient. Visit patient.info/patient-access or search ‘Patient Access’

© Patient Platform Limited - All rights reserved.