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Written by Franziska Spritzler and Jillian Kubala, MS, RD on December 15, 2021 — Medically reviewed by Jerlyn Jones, MS MPA RDN LD CLT, NutritionWe include products we think are useful for our readers. If you buy through links on this page, we may earn a small commission. Here’s our process.Vitamin D plays an important role in maintaining your overall health.It’s necessary for the growth and development of your muscle cells, proper functioning of the innate and adaptive immune system, maintenance of the health of your skeletal system, and more (1, 2).This is why insufficient or deficient levels of vitamin D may increase your risk of disease and infection, bone demineralization, and many other negative health outcomes (2, 3).Vitamin D deficiency is extremely common. In fact, up to 40% of U.S. adults are considered to have insufficient levels (not enough) of vitamin D, while around 6% are considered deficient in vitamin D. Worldwide, vitamin D deficiency affects around 1 billion people (1, 2, 3).Factors that increase the risk of vitamin D deficiency include (3, 4): skin colorwhere you liveyour ability to absorb vitamin Dsun exposuremedical conditionsbody weightBecause vitamin D insufficiency and deficiency are common, many people use vitamin D supplements to maintain healthy vitamin D levels.Vitamin D supplements are considered very safe, and toxicity is uncommon. This is because a healthy person would need to take extremely large doses of vitamin D over time in order to reach toxic or dangerous levels in the body (5).However, vitamin D toxicity is more common in people with certain medical conditions. These include (5):granulomatous disorderscongenital disorderssome lymphomasdysregulated vitamin D metabolismAlthough uncommon, vitamin D toxicity can occur, especially in cases of: accidental overdoseprescription errorsmisuse of high-dose vitamin D supplementsVitamin D toxicity goes by a few other names, including hypervitaminosis D and vitamin D intoxication.This article discusses 6 symptoms and side effects related to vitamin D toxicity. Share on PinterestAlma Hvoshtikova/StocksyIn order for vitamin D to reach toxic or dangerous levels in the body, it needs to exceed 100 nanograms (ng) per mL.Hypervitaminosis D is defined as blood vitamin D levels over 100 ng/mL, while vitamin D intoxication is defined as serum levels over 150 ng/mL (6, 7).Recommendations on optimal vitamin D levels vary, but research suggests that levels between 30–60 ng/mL are likely optimal and may help protect against illness and disease (8, 9). Even when taking high dose vitamin D supplements, it’s unlikely that a healthy person’s blood vitamin D levels would come close to reaching excessive or toxic levels. Most cases of vitamin D toxicity are caused by inappropriate supplement dosing and prescription errors.For example, in a 2020 case report, a 73-year-old man developed vitamin D toxicity after taking 10,000 IU of vitamin D per day for many years (10).In another 2020 case report, a 56-year-old woman who took an average of 130,000 IU of vitamin D per day for 20 months in hopes of improving symptoms of multiple sclerosis was hospitalized for symptoms including nausea, vomiting, and muscle weakness.Her vitamin D levels were discovered to be 265 ng/mL (11).Note that 130,000 IU is over 30 times the generally recommended safe upper limit of 4,000 IU per day.Even though toxicity is unlikely if you keep your daily intake levels below 10,000 IU per day and avoid excessively high intakes of vitamin D supplements, experts recommend that people with typical vitamin D levels do not exceed 4,000 IU of vitamin D per day (12). Keep in mind that people who are low or deficient in vitamin D typically need to take much higher levels than the current Tolerable Upper Intake Level (UL) of 4,000 IU per day to reach and maintain optimal vitamin D levels. However, make sure to consult a healthcare professional on what dosage you should take. This will help you avoid potential inappropriate or dangerous dosing. SummaryVitamin D levels greater than 100 ng/mL may be harmful. Toxicity symptoms have been reported at extremely high blood levels in cases where people took megadoses (very high doses) of vitamin D supplements for extended periods of time.Vitamin D helps your body absorb calcium from the food you eat. In fact, this is one of its most important roles.However, if your vitamin D intake is excessive, your blood calcium may reach levels that can cause unpleasant and potentially dangerous symptoms.The symptoms of vitamin D toxicity are primarily related to hypercalcemia, which means excessively high blood calcium levels (13).Symptoms of hypercalcemia include:digestive distress, such as vomiting, nausea, constipation, and stomach painfatigue, dizziness, hallucinations, and confusionloss of appetiteexcessive urinationkidney stones, kidney injury, and even kidney failurehigh blood pressure and heart abnormalitiesdehydrationThe normal range of blood calcium is 8.5–10.8 mg/dL (14, 15).Hypercalcemia typically develops after people take megadoses of vitamin D for a prolonged period of time.For example, a 2015 case study reported that an older man with dementia who received 50,000 IU of vitamin D daily for 6 months was repeatedly hospitalized with symptoms related to high calcium levels (16).In the 2020 case report mentioned earlier, the woman who took an average of 130,000 IU of vitamin D per day for 20 months was also hospitalized for symptoms related to hypercalcemia (11).These included nausea, vomiting, muscle weakness, and kidney injury. Her blood calcium levels were 3.23 mmol/L (12.9 mg/dL) (11).Hypercalcemia can be life threatening and requires immediate medical attention. SummaryTaking too much vitamin D may result in excessive absorption of calcium, which can cause several potentially dangerous symptoms.The main side effects of excessive vitamin D levels are related to excessive calcium in the blood (13).Some of the main symptoms of hypercalcemia include:nauseavomitingconstipationdiarrheapoor appetiteHowever, not all people with hypercalcemia experience the exact same symptoms.One woman experienced nausea and weight loss after taking a supplement that was later found to contain 78 times more vitamin D than stated on the label (17).Importantly, these symptoms occurred in response to extremely high doses of vitamin D3, which led to calcium levels greater than 12 mg/dL.In one case study, a boy developed stomach pain and constipation after taking improperly labeled vitamin D supplements, whereas his brother experienced elevated blood levels without any other symptoms (18).In another case study, an 18-month-old child who was given 50,000 IU of vitamin D3 for 3 months experienced diarrhea, stomach pain, and other symptoms. These symptoms resolved after the child stopped taking the supplements (19).SummaryTaking vitamin D can increase levels of calcium in the blood, and too much calcium can cause side effects. If you take large doses of vitamin D, you may experience stomach pain, loss of appetite, constipation, or diarrhea as a result of elevated calcium levels.Hypercalcemia can lead to altered mental status in people with vitamin D toxicity.People with vitamin D toxicity-induced hypercalcemia commonly have symptoms like confusion, depression, and psychosis. In extreme cases, coma has been reported (5). In a 2021 case report, a 64-year-old man accidentally took 200,000 IU of vitamin D per day because he misunderstood medication instructions. He showed altered mental status and other serious symptoms related to hypercalcemia.He remained agitated and confused for the first 10 days of his stay in the hospital, but his symptoms gradually improved as his calcium levels dropped. It took about 18 days for his calcium to return to expected levels (20).SummaryVitamin D toxicity can cause symptoms like confusion, agitation, and unresponsiveness. This also appears to result from elevated calcium levels, which high doses of vitamin D can cause.In some cases, vitamin D toxicity can result in kidney injury and even kidney failure. This is because having too much vitamin D in the body can lead to high levels of calcium, which can lead to water loss through too much urination and calcification of the kidneys (21).Hypercalcemia can also cause the blood vessels of the kidneys to constrict, which leads to decreased kidney function (21).Indeed, many studies have reported moderate-to-severe kidney injury in people who develop vitamin D toxicity (11, 18, 19, 22).Interestingly, a vitamin D deficiency can also harm the kidneys and lead to severe complications in those with kidney disease. That’s one reason why maintaining optimal blood levels of vitamin D is critical (23, 24).SummaryToo much vitamin D may lead to kidney injury and can even lead to kidney failure in some cases.Vitamin D is involved in calcium absorption, immune function, and protecting bone, muscle, and heart health. It occurs naturally in food and your body can also produce it when your skin is exposed to sunlight.Yet, aside from fatty fish, there are few foods rich in vitamin D. What’s more, most people don’t get enough sun exposure to produce adequate vitamin D.So, deficiency is very common. In fact, estimates suggest that about 1 billion people worldwide are deficient in vitamin D, while 50% of people may have levels insufficient to maintain optimal health (2, 3).The only way to tell if you’re insufficient or deficient is to have a healthcare professional test your vitamin D levels. Vitamin D deficiency is generally recognized as serum vitamin D levels less than 20 ng/mL. People who have levels that fall between 21–29 ng/mL are considered to have insufficient vitamin D levels (1).If your healthcare professional finds that you have a vitamin D deficiency or insufficient vitamin D levels, they will likely recommend a supplement or vitamin D injections. Healthcare professionals may recommend people who are very low in vitamin D take very high weekly doses of 50,000 IU for 8 weeks, followed by a maintenance dose of 2,000 IU per day after their levels reach 30 ng/mL (3).Your doctor will decide the most appropriate dose of vitamin D for you, depending on your vitamin D levels and your overall health. Even though vitamin D toxicity isn’t common, you may be at risk if you misuse over the counter vitamin D supplements, prescription vitamin D supplements, or injections.If you’re taking very high dose vitamin D supplements or are receiving vitamin D injections, your doctor will monitor your vitamin D levels to ensure they aren’t becoming potentially dangerous.Avoid taking high dose vitamin D supplements unless your healthcare professional recommends them.SummaryVitamin D deficiency is quite common. For this reason, many people need to take vitamin D supplements. However, it’s important to avoid taking high dose vitamin D supplements, except with the guidance of a healthcare professional.Vitamin D is extremely important for your overall health. Even if you follow a healthy diet, you may require supplements to achieve optimal blood levels.However, it’s also possible to have too much of a good thing.Make sure to avoid excessive doses of vitamin D. Generally, for people with adequate vitamin D levels, taking supplements of 4,000 IU or fewer per day is considered safe.Healthcare professionals may prescribe vitamin D supplements for people with vitamin D insufficiency or deficiency. They will monitor your blood levels to ensure your safety and will reduce your dose or discontinue the supplement once you reach optimal levels. Avoid taking high dose vitamin D supplements unless you’re being monitored by a healthcare professional.It’s also important to note that some cases of vitamin D toxicity happened because people took improperly labeled supplements. If you want to take vitamin D supplements, buy them from reputable manufacturers to reduce the risk of accidental overdose due to improper labeling.If you’ve been taking vitamin D supplements and are experiencing any of the symptoms listed in this article, consult a healthcare professional as soon as possible.Read this article in Spanish.LetsGetChecked Last medically reviewed on December 15, 2021This article is based on scientific evidence, written by experts and fact checked by experts.Our team of licensed nutritionists and dietitians strive to be objective, unbiased, honest and to present both sides of the argument.This article contains scientific references. The numbers in the parentheses (1, 2, 3) are clickable links to peer-reviewed scientific papers.

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