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* **Potassium**

**Toxicity level**: The normal level of potassium in the bloodstream is in the range of 3.5–5.0 mM, while levels of 6.3–8.0 mM (severe hyperkalemia)

**Potassium deficiency manifestation**: known as hypokalemia, is a rare condition and typically occurs because of excessive losses of potassium from the body rather than from inadequate potassium intake. Hypokalemia appears to be the most common source of electrolyte imbalance.

The major cause of low potassium is the use of diuretics. Prolonged use of laxatives and steroid medications may also lead to potassium deficiency. In addition, diarrhea, vomiting and severe dehydration often cause a rapid loss of potassium. Other conditions associated with potassium deficiency include eating disorders, low-calorie diets, kidney disorders, alcoholism, and diabetic acidosis and colon polyps. **Symptoms of low potassium** usually include;

* fatigue,
* appetite loss,
* nausea,
* muscle cramps and muscle weakness
* Irregular heartbeats or decreased heart rate. The most severe cases of hypokalemia can be fatal.

#### Potassium Overdose: The steroid hormone aldosterone controls potassium levels. As a result, excessive amounts of potassium are normally excreted from the body so that it does not cause any harm. However, when kidney problems or other illness cause excess potassium to build up, then a condition known as hyperkalemia occurs. Overuse of potassium supplements or consuming energy-fitness drinks when a person becomes dehydrated can also lead to potassium toxicity. Other possible causes of high potassium include:

* Abnormal breakdown of body proteins
* Adrenal gland failure (Addison’s disease)
* Destruction of red blood cells following severe burns or injury
* Muscle breakdown resulting from exercise, heat or medications
* Severe infection
* Use of certain hypertensives, such as ACE inhibitors

Hyperkalemia can cause heart problems and in its most severe form it can be deadly.

**Symptoms of high potassium**. Hyperkalemia often does not have any symptoms. However, when symptoms do occur, they include;

* nausea,
* muscle fatigue and weakness,
* paralysis,
* abnormal heart rhythms and slow,
* Weak or absent pulse.
* **Calcium**

**Toxicity level:** the normal range is 2.1–2.6 [mmol/L](https://en.wikipedia.org/wiki/Mmol/L) (8.8–10.7 [mg/dL](https://en.wikipedia.org/wiki/Mg/dL), 4.3–5.2 [mEq/L](https://en.wikipedia.org/wiki/MEq/L)), with levels greater than 2.6 mmol/L defined as hypocalcaemia and with levels less than 2.1 mmol/l defined as hypocalcaemia

**Deficiency manifestation**: Hypercalcemia is a condition in which the calcium level in your blood is above normal. Too much calcium in your blood can weaken your bones, create kidney stones, and interfere with how your heart and brain work.

Hypocalcaemia is usually a result of overactive parathyroid glands. These four tiny glands are situated in the neck, near the thyroid gland. Other causes of hypocalcaemia include cancer, certain other medical disorders, some medications, and taking too much of calcium and vitamin D supplements. Signs and symptoms of hypocalcaemia range from nonexistent to severe. Treatment depends on the cause**.**

One might not have signs or symptoms if hypocalcaemia is mild. More-severe cases produce signs and symptoms related to the parts of your body affected by the high calcium levels in your blood. Examples include:

* **Kidneys:** Excess calcium makes your kidneys work harder to filter it. This can cause excessive thirst and frequent urination.
* **Digestive system:** Hypocalcaemia can cause stomach upset, nausea, vomiting and constipation.
* **Bones and muscles:** In most cases, the excess calcium in your blood was leached from your bones, which weakens them. This can cause bone pain and muscle weakness.
* **Brain:**Hypercalcemia can interfere with how your brain works, resulting in confusion, lethargy and fatigue. It can also cause depression.
* **Heart:** Rarely, severe hypocalcaemia can interfere with your heart function, causing palpitations and fainting, indications of cardiac arrhythmia, and other heart problems.
* **Magnesium**

**Toxicity level:** Diagnosis is based on a blood level greater than 1.1 mmol/L (2.6 mg/dL). It is severe if levels are greater than 2.9 mmol/L (7 mg/dL).

## Deficiency manifestation: Magnesium deficiency, also known as hypomagnesaemia .some symptoms of hypomagnesaemia are;

## 1.Muscle Twitches and Cramps; Twitches, tremors and muscle cramps are signs of magnesium deficiency. In worst case scenarios, deficiency may even cause seizures or convulsions Scientists believe these symptoms are caused by a greater flow of calcium into nerve cells, which overexcites or hyper stimulates the muscle nerves Keep in mind that involuntary muscle twitches may have many other causes. For example, they may be caused by stress or too much caffeine. They may also be a side effect of some medications or a symptom of a neurological disease, such as neuromyotonia or motor neuron disease.

## 2. Mental Disorders ;Mental disorders are another possible consequence of magnesium deficiency. These include apathy, which is characterized by mental numbness or lack of emotion. Worsened deficiency may even lead to delirium and coma additionally, observational studies have associated low magnesium levels with an increased risk of depression Scientists have also speculated that magnesium deficiency might promote anxiety, but direct evidence is lacking. One review concluded that [magnesium supplements](https://amzn.to/2XLe2YL) might benefit a subset of people with [anxiety](https://www.healthline.com/nutrition/16-ways-relieve-stress-anxiety) disorders, but the quality of the evidence is poor. Higher quality studies are needed before any conclusions can be reached .in short, it seems that a lack of magnesium may cause nerve dysfunction and promote mental problems in some people.

## 3. Osteoporosis ; Osteoporosis is a disorder characterized by weak bones and an increased risk of [bone](https://www.healthline.com/nutrition/build-healthy-bones) fractures. The risk of getting osteoporosis is influenced by numerous factors. These include old age, lack of exercise and a poor intake of vitamins D and K.Interestingly, magnesium deficiency is also a risk factor for osteoporosis. Deficiency might weaken bones directly, but it also lowers the blood levels of calcium, the main building block of bones Studies in rats confirm that dietary magnesium depletion results in reduced bone mass. Although no such experiments have been done in people, studies have associated poor magnesium intake with lower bone mineral density.

* **Chloride**

**Toxicity level:** The normal reference ranges for blood chloride are below. Values below the appropriate reference range may indicate **hypochloremia**:

* adults: 98–106 mEq/L
* children: 90–110 mEq/L
* newborn babies: 96–106 mEq/L
* premature babies: 95–110 mEq/L

**Deficiency manifestation:** one often won’t notice symptoms of hypochloremia. Instead, you may have symptoms of other electrolyte imbalances or from a condition that’s causing hypochloremia.

Symptoms include:

* fluid loss
* dehydration
* weakness or fatigue
* difficulty breathing
* diarrhea or vomiting, caused by fluid loss
* **iron**

**Toxicity level:** The amount of iron ingested may give a clue to potential toxicity. The therapeutic dose for iron deficiency anemia is 3–6 mg/kg/day. Toxic effects begin to occur at doses above 10–20 mg/kg of [elemental iron](https://en.wikipedia.org/w/index.php?title=Elemental_iron&action=edit&redlink=1). Ingestions of more than 50 mg/kg of elemental iron are associated with severe toxicity.

**Deficiency manifestation: iron deficiency**, or **sideropenia**, is the state in which a body lacks enough [iron](https://en.wikipedia.org/wiki/Iron) to supply its needs. Iron is present in all [cells](https://en.wikipedia.org/wiki/Cell_(biology)) in the [human body](https://en.wikipedia.org/wiki/Human_body) and has several vital functions, such as carrying [oxygen](https://en.wikipedia.org/wiki/Oxygen) to the tissues from the [lungs](https://en.wikipedia.org/wiki/Human_lung) as a key component of the [hemoglobin](https://en.wikipedia.org/wiki/Hemoglobin) protein, acting as a transport medium for electrons within the cells in the form of [cytochromes](https://en.wikipedia.org/wiki/Cytochrome), and facilitating oxygen [enzyme](https://en.wikipedia.org/wiki/Enzyme) reactions in various tissues. Too little iron can interfere with these vital functions and lead to [morbidity](https://en.wikipedia.org/wiki/Morbidity) and [death](https://en.wikipedia.org/wiki/Death)

Symptoms of iron deficiency can occur even before the condition has progressed to iron deficiency anemia.

Symptoms of iron deficiency are not unique to iron deficiency (i.e. not [pathognomonic](https://en.wikipedia.org/wiki/Pathognomonic)). Iron is needed for many enzymes to function normally, so a wide range of symptoms may eventually emerge, either as the secondary result of the anemia, or as other primary results of iron deficiency. Symptoms of iron deficiency include:

* [fatigue](https://en.wikipedia.org/wiki/Fatigue_(physical))
* [dizziness](https://en.wikipedia.org/wiki/Dizziness)/[lightheadedness](https://en.wikipedia.org/wiki/Lightheadedness)
* [pallor](https://en.wikipedia.org/wiki/Pallor)
* [hair loss](https://en.wikipedia.org/wiki/Hair_loss)
* [twitches](https://en.wikipedia.org/wiki/Myoclonus)
* [irritability](https://en.wikipedia.org/wiki/Irritability)
* [weakness](https://en.wikipedia.org/wiki/Muscle_weakness)
* [pica](https://en.wikipedia.org/wiki/Pica_(disorder))
* [brittle](https://en.wikipedia.org/wiki/Brittle_nails) or [grooved nails](https://en.wikipedia.org/wiki/Nail_disease#Shape_and_texture)
* hair thinning
* [Plummer–Vinson syndrome](https://en.wikipedia.org/wiki/Plummer%E2%80%93Vinson_syndrome): painful atrophy of the [mucous membrane](https://en.wikipedia.org/wiki/Mucous_membrane) covering the [tongue](https://en.wikipedia.org/wiki/Tongue), the [pharynx](https://en.wikipedia.org/wiki/Human_pharynx) and the [esophagus](https://en.wikipedia.org/wiki/Esophagus)
* impaired [immune function](https://en.wikipedia.org/wiki/Immune_function)
* [pagophagia](https://en.wikipedia.org/wiki/Pagophagia)
* [restless legs syndrome](https://en.wikipedia.org/wiki/Restless_legs_syndrome)

Continued iron deficiency may progress to [anemia](https://en.wikipedia.org/wiki/Anemia) and worsening fatigue. [Thrombocytosis](https://en.wikipedia.org/wiki/Thrombocytosis), or an elevated [platelet](https://en.wikipedia.org/wiki/Platelet) count, can also result. A lack of sufficient iron levels in the blood is a reason that some people cannot donate blood