Iron Deficiency

What You Need to Know

by Lara Spector, ND

Iron deficiency is the most common nutrient deficiency in the world.[1] Many women are iron-deficient, especially those who are menstruating, pregnant, postpartum, or breast-feeding. Iron deficiency is also commonly seen in those with chronic blood loss and/or gastrointestinal absorption issues. Untreated iron deficiency can lead to iron-deficiency anemia, which occurs when the body lacks sufficient amounts of iron to form normal red blood cells. Without enough iron, the body can't produce enough hemoglobin for red blood cells to deliver oxygen from the lungs to the tissues.

These are some of the symptoms that one may experience with iron deficiency or anemia:[2]

- Fatigue or weakness
- Shortness of breath
- Intolerance to exercise
- Cold hands/feet
- Low concentration or decreased cognitive functioning
- Dizziness
- Paleness
- Hair loss
- Brittle or grooved nails
- Frequent colds/flus

Iron Is Vital for Many Processes in the Body

In addition to delivering oxygen to the tissues, iron has many other important roles in the body. It is one of the most important nutrients for *immune function*, as it maintains

white blood cell levels, and for antibody production, and thus fights off infections. This might contribute to getting recurring colds/flus. Iron is also required for the *production of amino acids, hormones, and neurotransmitters*, which might explain lower concentration levels or lower thyroid function, as iron is an integral part of the enzyme reaction that produces neurotransmitters and thyroid hormones.[3]

Causes and Diagnosis of Iron Deficiency

Iron deficiency is most commonly caused by:[2]

- Chronic bleeding (e.g. excessive menstrual bleeding, gastrointestinal bleeding) or blood donation
- Inadequate intake from the diet (vegetarians and vegans are more prone to iron deficiency)
- Malabsorption syndromes (such as celiac disease, low stomach acid, bacterial overgrowth), inflammatory bowel syndromes or diseases
- Use of NSAIDs (nonsteroidal anti-inflammatory drugs such as aspirin or ibuprofen)
- Athletic lifestyle

Iron Studies

Diagnostics for iron-deficiency anemia consist of low hemoglobin, low serum iron, low serum ferritin (the storage form of iron), low transferrin saturation, and high total iron-binding capacity. It is important to note that ferritin level may be misleading, especially if there is acute or chronic inflammation, as ferritin is an acute phase reactant and increases in the presence of an inflammatory process.[1]

Treating Iron Deficiency

Treatment of iron deficiency should be targeted towards the cause of the deficiency. For example, a study by Rockey et al demonstrated that 60% of adult patients with iron-deficiency anemia may have an underlying gastrointestinal disorder (e.g. low stomach acid or excess inflammation), which needs to be investigated and treated, and similarly for women with heavy menstrual bleeding.[4]

Once the cause has been established and treatment is under way, iron-deficiency anemia is usually reversible with iron repletion, which usually includes the use of iron supplements and food sources of iron (see chart below).

Iron status should be assessed before starting iron supplementation, as iron overload may increase the incidence of cardiovascular disease and other chronic illnesses as well as cause harm to people who carry the iron-overload gene.[1]

Food Sources

There are two types of dietary iron: heme iron (animal-based) and nonheme (plant-based) iron. The heme form has been demonstrated to have a high bioavailability than the nonheme form.[1] In addition, the acidic environment of the stomach and certain foods are known to increase the bioavailability of dietary iron.[2] The guideline for recommended iron intake is 18 g for women aged 19–50.[6]

Heme Iron Sources

Food	Serving Size	Iron	% Guideline
Clam	100 g	28 mg	155%
Pork Liver	100 g	18 mg	100%
Lamb Kidney	100 g	12 mg	69%
Cooked Oyster	100 g	12 mg	67%
Cuttlefish	100 g	11 mg	60%
Lamb Liver	100 g	10 mg	57%
Octopus	100 g	9.5 mg	53%
Mussel	100 g	6.7 mg	37%
Beef Liver	100 g	6.5 mg	36%
Beef Heart	100 g	6.4 mg	35%

Nonheme Iron Sources

Food	Serving Size	Iron	% Guideline
Soybeans	250 ml	9.3 mg	52%
Raw Yellow Beans	100 g	7 mg	39%
Lentils	250 ml	7 mg	39%
Falafel	140 g	4.8 mg	27%
Soybean Kernels	250 ml	4.7 mg	26%
Toasted Sesame Seeds	30 g	4.4 mg	25%
Spirulina	15 g	4.3 mg	24%
Candied Ginger Root	30 g	3.4 mg	19%
Spinach	85 g	3 mg	17%

Iron Supplements

Iron is available in many dietary supplements, and there is quite a bit of variation among them with respect to dose, absorption, and effects on the gastrointestinal system. There are forms of iron supplements that have better bioavailability than others; for example, ferrous iron is more bioavailable than ferric iron. Also, other forms such as heme iron or polysaccharide-iron complexes may have fewer gastrointestinal side effects (e.g. constipation, nausea).

Important Tips for Taking Iron

- Iron absorption (especially the nonheme form) is enhanced by taking vitamin C with the iron source
- Absorption is reduced by consuming foods rich in tannins—such as coffee or black tea—around the same time as the iron source
- Iron supplements may be more effective when taken at a separate time of day from supplements containing vitamin E, calcium, magnesium, or zinc, or medications such as antacids, as iron absorption is reliant on stomach acid which is depleted by these drugs[1]

References

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