



Why is iron so important for your health?

Iron is an essential nutrient for your body, which you get from your food. It is needed for your mental and physical health and to keep your energy levels up.¹⁻³ Iron is present in a substance called haemoglobin, which is found in red blood cells. Haemoglobin carries oxygen in the blood from the lungs to the rest of the body.⁴ Oxygen is required in your brain for concentration and in your muscles for physical energy.⁵ Iron is also needed to maintain a healthy immune system, helping you to fight off infections.⁶

What happens if you don't get enough iron?

If the iron levels in your body are low you can become iron deficient. The recommended levels for iron in the body are different for different people, depending on age and gender.⁷ Iron deficiency is the most common nutrient deficiency in the world.⁸

Over time, iron deficiency can mean that your body makes fewer healthy red blood cells, a condition known as Iron Deficiency Anaemia (IDA). In industrialized countries, between two and four percent of people have iron deficiency anaemia.^{7,9,10} There are many symptoms of iron deficiency anaemia, however one of the main signs is feeling fatigued or exhausted¹ because your blood is less able to transport oxygen around your body.⁴

If iron deficiency is not treated there can be long-term consequences for your health. Fatigue and other symptoms of iron deficiency can also lower your quality of life and reduce your ability to concentrate and be productive at work.³ If you think you may be anaemic or iron deficient, it is important that you speak to your doctor so that they can investigate further.

Are you getting enough iron?

Balancing the supply and demand for iron in your body is important to maintain good health. Normally your iron levels remain in balance, with iron from your diet replacing the iron stores used up by your body.¹ The iron in your food is absorbed into the bloodstream in your small intestine.¹

The supply and demand for iron in your body can become unbalanced for a number of reasons and this can lead to iron deficiency.

A decreased supply of iron to your body can be caused by...

- **A lack of iron in your diet.** Iron can be found in both animal products and plant foods. Iron from animal products (known as haem iron) is better absorbed by your body than iron from plant foods (known as non-haem iron).¹ If you are vegetarian or vegan it is more likely that you will not be getting enough iron.² Choosing what you eat wisely can help to keep your iron levels up.

- **Iron from your food not being absorbed properly in your small intestine.** If you have Inflammatory Bowel Disease (Crohn's disease or ulcerative colitis) or coeliac disease, then the lining of your small intestine may be inflamed. This means that less iron can be absorbed from your food into your bloodstream.³⁻⁵

An increased demand for iron may be caused by...

- **Blood loss, for example as a result of:**
 - Heavy periods.²
 - Internal bleeding from your gut (gastro-intestinal bleeding).³
 - Frequent blood donation.⁶
 - Traumatic injuries/ accidents.^{7,8}
 - Surgery.^{7,9,10}
- **Increased demand for red blood cells or oxygen in your body, for example as a result of:**
 - Intense exercise.¹¹
 - Growth and development in children and adolescents.¹
 - Pregnancy.²
- **Chronic inflammation in diseases such as Inflammatory Bowel Disease or Rheumatoid Arthritis:** If you have a condition that involves chronic inflammation, your immune system can block the release of iron from your body's iron stores, reducing the amount of iron available to make red blood cells.¹²
- **Other medical conditions and/or therapies, such as haemodialysis for patients with kidney disease.**

If you are not getting enough iron, for any reason, you might find yourself lacking in energy and feeling exhausted day after day. While there are other symptoms of iron deficiency, extreme tiredness or fatigue is often reported by patients.⁴

Do you feel more than just tired?

Everyone gets tired from time to time, but if you feel exhausted every day, it may be that you are suffering from fatigue. How do you tell the difference between tiredness and fatigue?

A good first step towards understanding why you are feeling tired is to look at your lifestyle and daily stresses and strains. These might include:

- Lack of exercise.¹⁻³
- Lack of sleep.⁴
- Too much physical activity.⁵
- Excess caffeine intake,⁶ or excess alcohol intake.⁷
- Illnesses such as colds or flu.⁵

If you are tired for one of these reasons, it is likely that your tiredness will not last very long and that you will feel better after exercising, resting, or getting more sleep.⁵



Use our Symptom Browser to see the complete list of symptoms that iron deficiency can cause and to understand what each of these symptoms involves.

However if you are feeling exhausted, and this continues day after day, it could be that you are “more than tired” and are suffering from fatigue. If you are experiencing fatigue, you may feel physically and mentally exhausted and lack energy for a number of days each week, even if you have not been doing any physical activities that are particularly tiring.⁸ You may also be too exhausted to complete normal daily tasks such as getting dressed or going shopping, and you may often feel too tired to spend time with friends or family. Some people have described fatigue as feeling “listless”, “washed out” or “cranky”.

Fatigue is common and is often the first problem that people mention when they visit their doctors.⁹ It is a complex symptom because it can be caused by many different underlying conditions, such as:

- *Iron deficiency and iron deficiency anaemia.*¹⁰
- *Anaemia due to other reasons, such as low levels of vitamin B12 or folate.*¹¹
- *Hormonal conditions such as hypothyroidism and diabetes.*¹²
- *Chronic fatigue syndrome, also called myalgic encephalomyelitis (ME).*¹²
- *Depression,*^{2,13} *and sleep problems.*⁴
- *Iron overload, known as haemochromatosis,*¹⁴ *where too much iron can lead to iron building up in the organs of your body.*¹⁵

Because there are so many reasons why you may experience fatigue it is important that you talk to your doctor to discuss how you feel in more detail. Your doctor is in the best position to diagnose fatigue and to discuss any possible treatment options with you.

If your fatigue is due to iron deficiency or iron deficiency anaemia, increasing your iron intake through your diet and, if necessary, through treatment can make you feel much better. This is why it is important to talk to your doctor and to be on the look-out for other signs that you might be iron deficient.

Other signs you might be iron deficient

Fatigue, headache and irritability are common symptoms of iron deficiency,^{1,2} but there are other symptoms too. You may experience one or more of these symptoms at the same time.

Apart from fatigue, the other symptoms of iron deficiency include:

Looking Pale.

Haemoglobin is a red-coloured pigment. If you are iron deficient, there may be less haemoglobin in your blood and you may look pale.³ Your whole body might look pale but some people can notice the paleness most easily on their face, nails, inner mouth and lining of the eyes. If you pull your lower eyelid down, the colour of the lining should be a rich, red colour. If it is a very pale peach colour or yellow, this may indicate that you have iron deficiency or iron deficiency anaemia.

Shortness of Breath and a Racing Heart.⁴

During exercise, it is normal that you might experience shortness of breath and a racing heart because there is an increased demand for oxygen in your body. If you are iron deficient, your blood may not contain enough oxygen for your muscles to do normal activities such as walking. Your body tries to make up for

this by increasing your breathing rate to get more oxygen into your body, and by increasing your heart rate to help move the oxygen around your body.

Sore Tongue or Dry Mouth.⁵

Iron deficiency can affect the surface of your tongue making it feel sore for no apparent reason. Likewise, you may have an uncomfortably dry mouth even if you have been drinking plenty of liquids.

Cracks at the Corners of Your Mouth.⁶

Iron deficiency can also cause the appearance of sore, red, flaky cracks at one or both of the sides of your mouth. This feels more extreme than when your lips are chapped due to cold weather.

Mouth Ulcers.⁷

Mouth ulcers are sore white patches on the inside your mouth. There are many reasons why you might have mouth ulcers, including biting the inside of your mouth, stress and being run-down, but another reason could be iron deficiency.

Cold Intolerance or Cold Hands and Feet.⁸

If you feel the cold easily or regularly have cold hands and/or feet even if the temperature around you is not cold, it may be that there is not enough oxygen being delivered in your blood to your hands and feet, which could be a result of iron deficiency.

Craving to Eat Non-Food Items.^{9,10}

Craving certain foods from time to time is normal, especially during pregnancy. However if you have cravings to eat ice or non-food items such as clay, dirt, ash, and starch this could be a sign of iron deficiency. This kind of eating disorder is also called “pica”. If you are eating ice regularly you may also want to discuss this with your dentist as chewing ice can damage your teeth.

Restless Leg Syndrome.^{11,12}

Restless leg syndrome is a disturbing need to move your legs when resting, for example when you are in bed. This distressing feeling often goes away when you move your legs. It is possible to have restless leg syndrome but not be iron deficient, but if you are iron deficient you are nine times more likely to experience restless leg syndrome than the general population.

Hair Loss.^{13,14}

It is natural for some hair to fall out when you are washing or combing it, but if you are losing clumps of hair, or more hair than normal, it could be caused by iron deficiency. Increasing your iron levels could stop or reduce your hair loss.

Brittle,¹⁵ or Spoon-Shaped Nails.¹⁶

Brittle nails chip and crack easily. Spending a lot of time with your hands in water or using some nail polishes can lead to brittle nails, but brittle nails can also be a sign of iron deficiency. Another sign of iron deficiency is ‘spoon-shaped nails’. These are nails that are dipped in the middle and raised at the edges to give a rounded appearance like a spoon.

Headache.¹⁷

Headaches can occur for many reasons such as colds, being dehydrated or eyesight problems. Repeated headaches could also be a sign of iron deficiency.

Increased Susceptibility to Infections.¹⁸

If you seem to be picking up more infections than usual, such as coughs and colds, this could be a sign that you have iron deficiency. Iron is needed by your body to maintain a healthy immune system.

Dizziness,^{13,19,20} Irritability,²¹⁻²³ and Loss of Concentration.²³⁻²⁵

Feeling irritable, dizzy or losing concentration quickly could be due to iron deficiency. Iron helps your blood deliver oxygen around the body, and feeling irritable or dizzy may be a sign that your brain is not getting enough oxygen.

Don't diagnose yourself. Talk to your doctor.

If you experience the symptoms listed above, or are concerned for your health in any way, it is important that you talk to your doctor to find out what the underlying problem might be. Your doctor will be able to perform tests to determine whether you have iron deficiency or if your symptoms are due to a different condition.

References

Why is iron so important for your health?

1. **Verdon F, Burnand B, Stubi C-LF, et al.** Iron supplementation for unexplained fatigue in non-anaemic women: double blind randomised placebo controlled trial. *BMJ*. 2003;326:1124.
2. **Brownlie T, Utermohlen V, Hinton PS, Haas JD.** Tissue iron deficiency without anemia impairs adaptation in endurance capacity after aerobic training in previously untrained women. *Am J Clin Nutr*. 2004;79(3):437-43.
3. **Haas JD, Brownlie IV T.** Iron Deficiency and Reduced Work Capacity : A Critical Review of the Research to Determine a Causal Relationship. *J Nutr*. 2001;131(2):676S-690S.
4. **Dean L.** 1. Blood and the cells it contains. *Blood Groups Red Cell Antigens*. 2005:1-6.
5. **Lozoff B, Beard J, Connor J, Felt B, Georgieff M.** Long-lasting Neural and Behavioral effects of iron deficiency in infancy. *Nutr Rev*. 2006;64:S34-S91.
6. **Dhur A, Galan P, Hercberg S.** Iron status, immune capacity and resistance to infections. *Comp Biochem Physiol*. 1989;94A(1):11-19.
7. **McLean E, Cogswell M, Egli I, Wojdyla D, de Benoist B.** Worldwide prevalence of anaemia, WHO Vitamin and Mineral Nutrition Information System, 1993-2005. *Public Health Nutr*. 2009;12(4):444-54. doi:10.1017/S1368980008002401.
8. **Radlowski EC, Johnson RW.** Perinatal iron deficiency and neuro-cognitive development. *Front Hum Neurosci*. 2013;7:1-11.
9. **CDCCDC. (n.d.).** Iron Deficiency --- United States 1999--2000. CDC MMWR. Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5140a1.htm>. Iron Deficiency --- United States, 1999--2000. CDC MMWR. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5140a1.htm>.
10. **Anne C. Looker, Peter R. Dallman, Margaret D. Carroll, Elaine W. Gunter CLJ.** Prevalence of Iron Deficiency in the United States. *JAMA*. 1997;277(12):973-976.

Are you getting enough iron?

1. **Hurrell R, Egli I.** Iron bioavailability and dietary reference values. *Am J Clin Nutr*. 2010;91:1461-1467. doi:10.3945/ajcn.2010.28674F. Am.
2. **Killip S, Bennett JM, Chambers MD.** Iron deficiency anemia. *Am Fam Physician*. 2007;75(5):671-8.
3. **Stein J, Hartmann F, Dignass AU.** Diagnosis and management of iron deficiency anemia in patients with IBD. *Nat Rev Gastroenterol Hepatol*. 2010;7(11):599-610. doi:10.1038/nrgastro.2010.151.
4. **Miller JL.** Iron deficiency anemia: a common and curable disease.

Cold Spring Harb Perspect Med. 2013;3(7):1-13. doi:10.1101/csh-perspect.a011866.

5. **Presutti RJ, Cangemi JR, Cassidy HD, Hill D a.** Celiac disease. *Am Fam Physician*. 2007;76(12):1795-802.
6. **Finch CA, Cook JD, Labbe RF, Culala M.** Effect of blood donation on iron stores as evaluated by serum ferritin. *Blood*. 1977;50(3):441-7.
7. **Yip R, Parvanta I, Cogswell M, et al.** Recommendations to prevent and control iron deficiency in the United States. *Morb Mortal Wkly Rep*. 1998;47(RR-3):1-29.
8. **Topley E, Clarke R.** The anemia of trauma. *Blood*. 1956;11(4):357-69.
9. **Love AL, Billett HH.** Obesity, bariatric surgery, and iron deficiency: true, true, true and related. *Am J Hematol*. 2008;83(5):403-9. doi:10.1002/ajh.21106.
10. **Foss NB, Kehlet H.** Hidden blood loss after surgery for hip fracture. *J Bone Joint Surg Br*. 2006;88(8):1053-9. doi:10.1302/0301-620X.88B8.17534.
11. **Chatard JC, Mujika I, Guy C, Lacour JR.** Anaemia and iron deficiency in athletes. Practical recommendations for treatment. *Sports Med*. 1999;27(4):229-40.
12. **Goddard AF, James MW, McIntyre AS, Scott BB.** Guidelines for the management of iron deficiency anaemia. *Gut*. 2011;60(10):1309-16. doi:10.1136/gut.2010.228874.

Do you feel more than tired?

1. **Schwartz AL, Mori M, Gao R, Nail LM, King ME.** Exercise reduces daily fatigue in women with breast cancer receiving chemotherapy. *Med Sci Sports Exerc*. 2001;33(5):718-723.
2. **Lewis G, Wessely S.** The epidemiology of fatigue: More questions than answers. *J Epidemiol Community Health*. 1992;46:92-97.
3. **Valdini AF, Steinhardt SI, Jaffe AS.** Demographic Correlates of Fatigue in a University Family Health Centre. *Fam Pract*. 1987;4(2):103-107.
4. **Åkerstedt T, Knutsson A, Westerholm P, Theorell T, Alfredsson L, Kecklund G.** Mental fatigue, work and sleep. *J Psychosom Res*. 2004;57(5):427-433.
5. **Belza B.** The impact of fatigue on exercise performance. *Arthritis Care Res*. 1994;7(4):176-80.
6. **Calamaro CJ, Mason TB a, Ratcliffe SJ.** Adolescents living the 24/7 lifestyle: effects of caffeine and technology on sleep duration and daytime functioning. *Pediatrics*. 2009;123(6):e1005-10. doi:10.1542/peds.2008-3641.
7. **Prat G, Adan A, Pérez-Pàmies M, Sànchez-Turet M.** Neurocognitive effects of alcohol hangover. *Addict Behav*. 2008;33(1):15-23. doi:10.1016/j.addbeh.2007.05.002.
8. **Dittner AJ, Wessely SC, Brown RG.** The assessment of fatigue: a practical guide for clinicians and researchers. *J Psychosom Res*. 2004;56(2):157-70.
9. **Ridsdale L, Evans a, Jerrett W, Mandalia S, Osler K, Vora H.** Patients with fatigue in general practice: a prospective study. *BMJ*. 1993;307(6896):103-6.
10. **Wood MM, Elwood PC.** Symptoms of iron deficiency anaemia: A community survey. *Br J Prev Soc Med*. 1966;20:117-121.
11. **Smith DL.** Anemia in the elderly. *Am Fam Physician*. 2000;62(7):1565-72.
12. **Nijrolder I, van der Windt D, de Vries H, van der Horst H.** Diagnoses during follow-up of patients presenting with fatigue in primary care. *CMAJ*. 2009;181(10):683-7. doi:10.1503/cmaj.090647.
13. **Targum SD, Fava M.** Fatigue as a Residual Symptom of Depression. *Innov Clin Neurosci*. 2011;8(10):40-43.
14. **McDonnell SM, Preston BL, Jewell SA, et al.** A survey of 2,851 patients with hemochromatosis: symptoms and response to treatment. *Am J Med*. 1999;106(6):619-24.

15. **Schümann K, Elsenhans B, Mäurer a.** Iron supplementation. *J Trace Elem Med Biol.* 1998;12(3):129-40. doi:10.1016/S0946-672X(98)80001-1.

Other signs of ID

1. **Revez L, Gyte G, Cuervo L.** Treatments for iron-deficiency anaemia in pregnancy (Review). *Cochrane Collab.* 2010;(1).
2. **Wood MM, Elwood PC.** Symptoms of iron deficiency anaemia: A community survey. *Br J Prev Soc Med.* 1966;20:117-121.
3. **Stoltzfus R, Edward-Raj A.** Clinical pallor is useful to detect severe anemia in populations where anemia is prevalent and severe. *J Nutr.* 1999;129(May):1675-1681.
4. **McDermid J, Lönnerdal B.** Iron. *Adv Nutr.* 2012;(1):532-533. doi:10.3945/an.112.002261.Table.
5. **Osaki T, Ueta E, Arisawa K, Kitamura Y, Matsugi N.** The pathophysiology of glossal pain in patients with iron deficiency and anemia. *Am J Med Sci.* 1999;318(5):324-9.
6. **Stein J, Hartmann F, Dignass AU.** Diagnosis and management of iron deficiency anemia in patients with IBD. *Nat Rev Gastroenterol Hepatol.* 2010;7(11):599-610. doi:10.1038/nrgastro.2010.151.
7. **Scully C.** ABC of oral health: Mouth ulcers and other causes of orofacial soreness and pain. *Bmj.* 2000;321(7254):162-165. doi:10.1136/bmj.321.7254.162.
8. **World Health Organization.** *Iron deficiency anaemia. Assessment, prevention and control: A guide for programme managers.*; 2001:1-114.
9. **Simpson E, Mull JD, Longley E, East J.** Pica during pregnancy in low-income women born in Mexico. *West J Med.* 2000;173(1):20-25.
10. **Lacey EP.** Broadening the perspective of pica: literature review. *Public Health Rep.* 1990;105(1):29-35.
11. **Wang J, O'Reilly B, Venkataraman R, Mysliwiec V, Mysliwiec A.** Efficacy of oral iron in patients with restless legs syndrome and a low-normal ferritin: A randomized, double-blind, placebo-controlled study. *Sleep Med.* 2009;10(9):973-5. doi:10.1016/j.sleep.2008.11.003.
12. **Sun ER, Chen CA, Ho G, Earley CJ, Allen RP.** Iron and The Restless Legs Syndrome. *Sleep.* 1998;21(4):381-387.
13. **Stein J, Dignass A.** Management of iron deficiency anemia in inflammatory bowel disease—a practical approach. *Ann Gastroenterol.* 2012;26:1-10.
14. **Trost LB, Bergfeld WF, Calogeras E.** The diagnosis and treatment of iron deficiency and its potential relationship to hair loss. *J Am Acad Dermatol.* 2006;54(5):824-44.
15. **Cashman MW, Sloan SB.** Nutrition and nail disease. *Clin Dermatol.* 2010;28(4):420-5.
16. **Love AL, Billett HH.** Obesity, bariatric surgery, and iron deficiency: true, true, true and related. *Am J Hematol.* 2008;83(5):403-9. doi:10.1002/ajh.21106.
17. **Vukovi -Cvetkovi V, Plavec D, Lovrenci -Huzjan A, Galinovi I, Seri V, Demarin V.** Is iron deficiency anemia related to menstrual migraine? Post hoc analysis of an observational study evaluating

clinical characteristics of patients with menstrual migraine. *Acta Clin Croat.* 2010;49(4):389-94.

18. **Dhur A, Galan P, Hercberg S.** Iron status, immune capacity and resistance to infections. *Comp Biochem Physiol A Comp Physiol.* 1989;94(1):11-9.
19. **Paterson JA, Davis J, Gregory M, et al.** A study on the effects of low haemoglobin on postnatal women. *Midwifery.* 1994;10(2):77-86.
20. **Janis M.** Supportive Oncology Iron Deficiency Anemia in Cancer Patients. *Oncol Hematol Rev.* 2012;8(2):74-80.
21. **Pasricha S-R, Hayes E, Kalumba K, Biggs B-A.** Effect of daily iron supplementation on health in children aged 4–23 months: a systematic review and meta-analysis of randomised controlled trials. *Lancet Glob Heal.* 2013;1(2):e77-e86. doi:10.1016/S2214-109X(13)70046-9.
22. **Radlowski EC, Johnson RW.** Perinatal iron deficiency and neurocognitive development. *Front Hum Neurosci.* 2013;7:1-11.
23. **Pinero DJ, Connor JR.** Iron in the Brain: An Important Contributor in Normal and Diseased States. *Neurosci.* 2000;6(6):435-453.
24. **Albacar G, Sans T, Martín-Santos R, et al.** An association between plasma ferritin concentrations measured 48 h after delivery and postpartum depression. *J Affect Disord.* 2011;131:136-42. doi:10.1016/j.jad.2010.11.006.
25. **Bhattacharyya PC, Nayak M.** Anaemia in elderly. *Med Updat* 2010. 2010;20:571-576.

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