

Anaemia, iron deficiency

Introduction

Anaemia occurs when there is a reduced number of red blood cells. This can be caused by an iron deficiency.

About the blood

Blood contains a fluid called plasma, which includes three different types of cells:

White blood cells are part of the body's immune system and defend it against infection.

Red blood cells carry oxygen around the body in a substance called haemoglobin.

Platelets help the blood to clot.

Haemoglobin

Haemoglobin transports oxygen in the blood. As blood passes through the lungs, the haemoglobin pulls in oxygen molecules and releases carbon dioxide molecules.

After leaving the lungs, haemoglobin delivers the oxygen molecules to the body's tissue and absorbs excess carbon dioxide molecules to take back to the lungs.

Bone marrow

Red blood cells, which contain haemoglobin, are produced in bone marrow (found inside larger bones). Millions of new cells are produced every day to replace old cells that break down.

Anaemia is a condition where the amount of haemoglobin in the blood is below the normal level, or there are fewer red blood cells than normal. There are several different types of anaemia and each one has a different cause, although iron deficiency anaemia is the most common type.

Other forms of anaemia can be caused by a lack of vitamin B12 or folate in the body. Read more about vitamin B12 and folate deficiency anaemia.

Symptoms of iron deficiency anaemia

The main symptoms of iron deficiency anaemia are tiredness and lethargy (lack of energy). Other symptoms include:

shortness of breath (dyspnoea)

changes in your appearance, such as a pale complexion and dry nails

Speak to your DOCTOR if you notice any of these symptoms. They will be able to diagnose iron deficiency anaemia with a simple blood test.

However, in most cases there won't be any symptoms at all, particularly if the cause is a slow loss of blood.

What causes iron deficiency anaemia?

Iron deficiency anaemia occurs when there isn't enough iron in the body. Iron is found in meat, dried fruit and some vegetables. Iron is used by the body to make haemoglobin, which helps store and carry oxygen in red blood cells.

This means if there is a lack of iron in the blood, organs and tissues will not get as much oxygen as they usually do.

There are many conditions that can lead to a lack of iron. In men, and post-menopausal women the most common cause is bleeding in the stomach and intestines. This can be caused by:

non-steroidal anti-inflammatory drugs (NSAIDs)

a peptic ulcer

stomach cancer or bowel cancer

In women of reproductive age, the most common causes of iron deficiency anaemia are:

heavy periods

pregnancy - because your body needs extra iron for your baby

Read more about the causes of iron deficiency anaemia.

Treating iron deficiency anaemia

Treatment for iron deficiency anaemia involves taking iron supplements to boost the low levels of iron in the body. This is usually effective and the condition rarely causes complications.

You will need to be monitored every few months to check the treatment is working and your iron levels have returned to normal.

The underlying cause will also need to be treated so anaemia does not come back.

Read more about how iron deficiency is treated.

Iron-rich foods

Foods that contain iron include:

dark-green leafy vegetables

beans

nuts

meat

dried fruit

Some foods and medicines can make it harder for your body to absorb iron. These may include:

tea and coffee

calcium, found in dairy products such as milk

antacids (medication to help relieve indigestion)

Complications

If iron deficiency anaemia is left untreated it can make you more susceptible to illness and infection, as a lack of iron in the body affects your immune system (the body's natural defence system).

Severe iron deficiency anaemia may increase the risk of developing complications that affect the heart or lungs such as:

tachycardia (an abnormally fast heartbeat)

heart failure, when your heart is not pumping blood around your body very efficiently

Pregnant women also have a higher risk of complications before and after birth.

Read more about the complications of iron deficiency anaemia.

Symptoms of iron deficiency anaemia

Many people with iron deficiency anaemia will only display a few signs or symptoms of the illness.

The most common symptoms include:

tiredness

lethargy (lack of energy)

shortness of breath (dyspnoea)

Less common symptoms include:

headache

tinnitus - perception of a noise in one or both ears or in your head that comes from inside your body, such as a ringing in your ears

an altered sense of taste

pica - a desire to eat non-food items, such as ice, paper or clay

a sore tongue

feeling itchy

hair loss

difficulty swallowing (dysphagia)

Changed appearance

You may also notice changes in your physical appearance. For example, signs you may have iron deficiency anaemia include:

a pale complexion

an abnormally smooth tongue

painful ulcers (open sores) on the corners of your mouth

dry, flaking nails

spoon-shaped nails

Slow-developing symptoms

The severity of your symptoms can depend on how quickly your anaemia develops. For example, you may notice few symptoms or they may develop gradually if your anaemia is caused by a chronic (long-term) slow loss of blood, such as a stomach ulcer.

Causes of iron deficiency anaemia

Iron deficiency anaemia occurs when the body does not have enough iron. A lack of iron can be caused by a number of factors.

Some are outlined below.

Monthly periods

In women of reproductive age, periods are the most common cause of iron deficiency anaemia.

Usually, only women with particularly heavy periods develop iron deficiency anaemia. If you have heavy bleeding over several consecutive menstrual cycles, it is known as menorrhagia.

Pregnancy

It is very common for women to develop iron deficiency during pregnancy. This is because your body needs extra iron so your baby has a sufficient blood supply and receives necessary oxygen and nutrients. Many pregnant women require an iron supplement, particularly from the 20th week of pregnancy.

Gastrointestinal blood loss

Your gastrointestinal tract is the part of your body responsible for digesting food. It is made up of the:

stomach - a sac-like organ that helps digest food by churning it and mixing it with acids to break it down into smaller pieces

intestines - which digest and absorb food and liquid

Bleeding in the stomach and intestines is the most common cause of iron deficiency anaemia in men and in women who have been through the menopause (when a woman's monthly periods stop).

Some of the causes of gastrointestinal bleeding are outlined below.

Non-steroidal anti-inflammatory drugs (NSAIDs)

Non-steroidal anti-inflammatory drugs (NSAIDs) can cause bleeding in the stomach. Ibuprofen and aspirin are two commonly prescribed NSAIDs.

If your DOCTOR suspects your medication is causing gastrointestinal bleeding, they may be able to prescribe a less harmful medicine as an alternative. Do not stop taking a medicine prescribed for you unless your DOCTOR advises you to.

Stomach ulcers

The acid in your stomach (which usually helps your body to digest food) can sometimes eat into your stomach lining. When this happens, the acid forms an ulcer (an open sore). This is also known as a peptic ulcer.

Stomach ulcers can cause your stomach lining to bleed and this blood loss can lead to anaemia. In some cases the blood loss can cause you to vomit blood or pass blood in your stools (faeces). However, if the ulcer is slow bleeding, you may not have any symptoms.

In some rare cases, gastrointestinal bleeding can be caused by cancer, usually of the stomach or colon (part of the bowel, which makes up the digestive system).

In diagnosing the cause of your anaemia, your DOCTOR will check for possible signs of cancer. If your DOCTOR suspects cancer, you will be immediately referred to a gastroenterologist (a specialist in treating conditions of the digestive system) for a more thorough examination. This way, if cancer is found, it can be treated as quickly as possible.

Read more information about stomach cancer and bowel cancer.

Angiodysplasia

Gastrointestinal bleeding can also be caused by a condition called angiodysplasia. This is an abnormality of blood vessels in the gastrointestinal tract that can cause bleeding.

Chronic kidney disease

Many people with chronic kidney disease (CKD) develop iron deficiency anaemia.

Most people with kidney disease will be given iron supplements through an injection administered intravenously (into a vein). However, daily ferrous sulphate tablets may be tried first.

Read more information in the NICE guidelines on treating anaemia in people with chronic kidney disease.

Other causes

Other conditions or situations that cause blood loss and may lead to iron deficiency anaemia include:

inflammatory bowel disease - a condition that causes inflammation (redness and swelling) in the digestive system, such as Crohn's disease and ulcerative colitis

oesophagitis - inflammation of the gullet (oesophagus) caused by stomach acid leaking through it

schistosomiasis - an infection caused by parasites and mainly found in sub-Saharan Africa

blood donation: donating a large amount of blood may lead to anaemia

trauma - a serious accident, such as a car accident, may cause you to lose a lot of blood

nosebleeds - if you have a lot of nosebleeds, this may lead to anaemia, although it is rare

haematuria (blood in your urine) - also rare and may be the symptom of another condition

Malabsorption

Malabsorption (when your body cannot absorb iron from food) is another possible cause of iron deficiency anaemia. This may occur if you have:

coeliac disease, a condition that damages the lining of the intestines

a gastrectomy, a medical procedure to surgically remove your stomach, for example to treat stomach cancer

Diet

Unless you are pregnant, it is rare for iron deficiency anaemia to be caused solely by a lack of iron in your diet.

Some studies suggest vegetarians or vegans are more at risk of iron-deficiency anaemia due to the lack of meat in their diet. However, it is possible to gain enough iron in a vegetarian or vegan diet through other types of food such as:

beans

nuts

dried fruit, such as dried apricots

wholegrains, such as brown rice

fortified breakfast cereals

soybean flour

most dark-green leafy vegetables, such as watercress and curly kale

Read more information about vegetarian and vegan diets.

Pregnant women may have to increase the amount of iron-rich food they consume during their pregnancy to help avoid iron deficiency anaemia. Read more information about good sources of iron.

Diagnosing iron deficiency anaemia

See your DOCTOR if you experience symptoms of iron deficiency anaemia. A blood test will be able to confirm the diagnosis.

Your DOCTOR may also ask questions and carry out a physical examination to find the cause of your anaemia.

Blood test

To diagnose iron deficiency anaemia, a blood sample is taken from a vein in your arm and a full blood count is made. This means all the different types of blood cells in the sample will be measured.

If you have anaemia:

your levels of haemoglobin (a protein that transports oxygen) will be lower than normal

you will have fewer red blood cells (cells that contain haemoglobin) than normal

your red blood cells may be smaller and paler than usual

Your DOCTOR may also test for a substance called ferritin, a protein that stores iron. If your ferritin levels are low, you do not have much iron stored in your body and may have iron deficiency anaemia.

Read more information about blood tests.

Vitamin B12 and folate

If your DOCTOR suspects your anaemia may be due to a vitamin B12 and folate deficiency, rather than an iron deficiency, your levels of these substances may be tested. Folate works with vitamin B12 to help your body produce red blood cells.

Vitamin B12 and folate deficiency anaemia is more common in people who are over 75 years of age.

Finding the cause

To determine the underlying cause of your anaemia, your DOCTOR may ask questions about your lifestyle and medical history. For example, you may be asked about:

your diet - to see what you typically eat and whether this includes any iron-rich foods

any medicines that you take - to see whether you have been regularly taking a type of medicine that can cause gastrointestinal bleeding (bleeding from the stomach and intestines), such as ibuprofen or aspirin

your menstrual pattern - if you are a woman, your DOCTOR may ask if you have been experiencing particularly heavy periods (menorrhagia)

your family history - you will be asked whether your immediate family has anaemia or a history of gastrointestinal bleeding or blood disorders

blood donation - whether you regularly donate blood or have a history of excessive bleeding

other medical conditions - your DOCTOR may ask whether you have recently had another illness or experienced other symptoms, such as weight loss

Physical examination

A physical examination will usually only be necessary if the cause for your iron deficiency anaemia has not been found.

Your DOCTOR may:

examine your abdomen (stomach) as gastrointestinal bleeding is a common cause of anaemia

look for signs of heart failure (when your heart is not pumping blood around your body very efficiently), such as swollen ankles, as the main symptom of heart failure is extreme tiredness

Two other possible types of physical examination you may have are explained below.

Rectal examination

A rectal examination is generally only necessary if there is rectal bleeding. This is a common procedure which can help your DOCTOR determine whether there is something in your gastrointestinal tract that may be causing bleeding. Your DOCTOR will insert a gloved, lubricated finger into your rectum so they can feel for abnormalities.

A rectal examination is not something to be embarrassed about as it is a procedure your DOCTOR will be used to performing. It should not cause significant pain or discomfort and you will only usually feel a slight sensation that your bowels are moving around.

Pelvic examination

Women may have a pelvic examination if their DOCTOR suspects heavy menstrual bleeding (menorrhagia) may be the cause of their anaemia.

During a pelvic examination, your DOCTOR will examine your vulva and labia (external sex organs) for signs of bleeding or infection. They may also examine you internally. This will involve your DOCTOR inserting gloved, lubricated fingers into your vagina to feel whether your ovaries and uterus (womb) are tender or enlarged.

A pelvic examination will not be carried out without your consent, and you will have the option of having someone with you during the procedure.

Pregnancy

Iron deficiency anaemia is common during pregnancy so your DOCTOR will only look for an alternative cause if your haemoglobin level is particularly low, or if your symptoms or medical history suggest your anaemia may be caused by something else.

Referral

Your DOCTOR may refer you to a gastroenterologist (a specialist in treating conditions of the digestive system), who will be able to carry out a more thorough examination, if:

an abnormality was detected during a rectal examination

you are anaemic and have experienced sudden or unexplained weight loss

you are a woman who is not menstruating (having periods) and has a very low haemoglobin level

If you are a woman with heavy periods (menorrhagia), you may be referred to a gynaecologist if you fail to respond to treatment with iron supplements.

Treating iron deficiency anaemia

Treatment for iron deficiency anaemia usually involves taking iron supplements to replace missing iron and making necessary changes to address the underlying cause.

Iron supplements

Your DOCTOR will prescribe an iron supplement to restore iron missing from your body. The most commonly prescribed supplement is ferrous sulphate, taken orally (by mouth) two or three times a day.

Some people can experience side effects when taking iron supplements including:

nausea (feeling sick)

sickness

abdominal (tummy) pain

heartburn

constipation

diarrhoea

black stools (faeces)

These side effects should settle down over time. Taking ferrous sulphate with food or shortly after eating may help minimise side effects. Your DOCTOR may also recommend you only take one or two tablets a day, instead of three, if you are finding side effects difficult to cope with.

If ferrous sulphate is not suitable because of side effects, you may be prescribed a different iron supplement called ferrous gluconate. This supplement should cause fewer side effects because it contains a less concentrated dose of iron. However, it may take longer for iron levels in your body to be restored.

Storing iron supplements

If you have young children, it is important to store iron supplements out of their reach. This is because an overdose of iron supplements in a young child can be fatal.

Dietary advice

If a lack of iron in your diet is thought to contribute to your iron deficiency anaemia, your DOCTOR will advise on how to include more iron in your diet.

Iron-rich foods include:

dark-green leafy vegetables, such as watercress and curly kale

iron-fortified cereals

wholegrains, such as brown rice

beans
nuts
meat
apricots
prunes
raisins

To ensure a healthy, well-balanced diet, include foods from all major food groups in your diet. If you have iron deficiency anaemia, eat plenty of iron-rich foods, such as those listed above.

However, some foods and medicines can make it harder for your body to absorb iron. These may include:

tea and coffee

calcium, found in dairy products such as milk

antacids (medication to help relieve indigestion)

proton pump inhibitors (PPIs), which affect the production of acid in your stomach

wholegrain cereals - although wholegrains are a good source of iron themselves, they contain phytic acid which can interfere with how your body absorbs iron from other foods and pills

If you are finding it difficult to include iron in your diet, you may be referred to a dietitian (a health professional who specialises in nutrition).

They can give you detailed, personalised guidance about how you can change your diet.

Underlying causes

Your DOCTOR will also need to ensure the underlying cause of your anaemia is treated so anaemia does not become a recurrent problem.

For example, if non-steroidal anti-inflammatory drugs (NSAIDs) are causing bleeding in your stomach, your DOCTOR may prescribe an alternative type of medicine to help minimise the risk of stomach bleeding.

Heavy periods (menorrhagia) can also be treated in a number of different ways, using both medicines and special internal devices.

Read the full list of Health A-Z topics for more information if you have been diagnosed with another condition as well as iron deficiency anaemia.

Monitoring

Your DOCTOR will ask you to return for a check-up two to four weeks after you have started taking iron supplements to assess how well you have responded to the treatment. Your haemoglobin levels will be checked in a blood test.

If the result of the blood test shows an improvement, you will be asked to return in two to four months for a further blood test.

Once your haemoglobin levels and red blood cells are normal, your DOCTOR will usually recommend you continue taking iron supplements for three months to help replenish the iron stores in your body.

After this, depending on the cause of your iron deficiency anaemia, you should be able to stop taking the supplements. Your condition will then be monitored every three months for one year.

Continuing treatment

In some people, after iron stores in the body have been replenished, they start to fall again. This could happen if:

you do not eat an iron-rich diet

you are pregnant

you have heavy periods (menorrhagia)

In these circumstances, you may be prescribed an ongoing iron supplement. This will usually be one tablet a day. This will stop your anaemia returning.

If treatment fails

If your iron levels do not improve, your DOCTOR will ask how regularly you have been taking your iron supplements. Some people are put off taking the medication because of the side effects (see above). However, your conditions will not improve if you do not take the supplements.

If you have been taking the supplements as prescribed and your iron levels have still not improved, your DOCTOR may refer you for an assessment with a specialist.

Complications of iron deficiency anaemia

Iron deficiency anaemia rarely causes serious or long-term complications. However, some people with iron deficiency anaemia find that it affects their daily life.

Some common complications are outlined below.

Tiredness

As iron deficiency anaemia can leave you tired and lethargic (lacking in energy), you may be less productive and active at work. Your ability to stay awake and focus can be reduced, and you may not feel able to exercise regularly.

Immune system

Research has shown iron deficiency anaemia can affect your immune system (the body's natural defence system), making you more susceptible to illness and infection.

Heart and lung complications

Adults with severe anaemia may be at risk of developing complications that affect their heart or lungs. For example, you may develop:

tachycardia (an abnormally fast heartbeat)

heart failure, when your heart is not pumping blood around your body very efficiently

Pregnancy

Pregnant women with severe anaemia have an increased risk of developing complications, particularly during and after the birth. They may also develop postnatal depression (a type of depression some women experience after having a baby).

Research suggests babies born to mothers who have anaemia are more likely to:

be born prematurely (before week 37 of the pregnancy)

have a low birth weight

have problems with iron levels

do less well in mental ability tests

Restless legs syndrome (RLS)

Some cases of restless legs syndrome (RLS) are thought to be caused by iron deficiency anaemia. Doctors may refer to this as secondary RLS.

Restless legs syndrome (RLS) is a common condition affecting the nervous system, which causes an overwhelming, irresistible urge to move the legs. It also causes an unpleasant feeling in the feet, calves and thighs.

RLS caused by iron-deficiency anaemia is usually treated with iron supplements.