UNIVERSITY STUDENT HEALTH SERVICES • Fact Sheet

IRON DEFICIENCY ANEMIA

WHAT IS IT?

Iron deficiency is one of many causes of anemia, a condition in which the blood does not contain enough healthy red blood cells. Red blood cells use an iron-rich protein called hemoglobin to carry oxygen to (and remove carbon dioxide from) your body. Hemoglobin is also the substance responsible for the blood's red color. Iron deficiency anemia develops over time if your body does not have enough iron to build hemoglobin and red blood cells.

WHAT CAUSES IT?

Iron deficiency occurs if your body is losing too much iron or if you are not taking in enough iron. The most common causes are blood loss and conditions that decrease iron absorption from the intestinal tract. Untreated iron deficiency will eventually result in anemia.

❖ BLOOD LOSS

This is the most common cause of iron deficiency anemia in the US. It is more common in women because of menstruation. About 15-20 mg of iron is lost in every menstrual cycle. Women with heavier periods are at higher risk for anemia.

Slow chronic blood loss, often from the gastrointestinal tract, can also lead to iron deficiency anemia. Causes include colon cancer, inflammatory bowel diseases, and stomach ulcers. Stomach ulcers can result from frequent use of alcohol or anti-inflammatory drugs (like ibuprofen or aspirin).

❖ INABILITY TO ABSORB IRON

The small intestine absorbs iron and other nutrients from food. Diseases that commonly affect the small intestine, such as Crohn's or celiac disease, can lead to poor iron absorption. Surgeries that remove or bypass part of the small intestine can also lead to iron deficiency.

Regular use of medicines that reduce acid in the stomach can interfere with iron absorption because stomach acid is needed to convert dietary iron into a form that the small intestine can absorb.

❖ DIET LOW IN IRON

Your body gets iron regularly from foods that you eat. Over time, a diet too low in iron will result in anemia. This is less likely to occur in developed countries like the US. However, iron deficiency is not unusual during pregnancy because of the body's increased iron requirements.

There are 2 main types of iron:

- Heme iron is found only in meat, fish, and poultry. It is more than twice as efficiently absorbed as non-heme iron.
- Non-heme iron is found in eggs, milk, dairy products, vegetables, and other plant foods. Vegetarian diets can provide enough iron if the right foods are eaten.

Good plant-based sources of iron include spinach and other dark green leafy vegetables, legumes, peas, dried fruits (apricots, raisins), soy products, nuts (peanuts, almonds) and seeds. Non-heme iron is also found in iron-fortified foods, like cereal, bread, and pasta.

HOW MUCH IRON DO I NEED?

The recommended daily allowance for elemental iron in adults is:

- 8 mg/day for men and postmenopausal women.
- 18 mg/day for menstruating women.
- 27 mg/day for pregnant women.

WHAT ARE THE SYMPTOMS?

Symptoms of iron deficiency vary from person to person. It is possible to have symptoms even before anemia develops; however, most of the time, mild iron deficiency does not cause any symptoms. Symptoms, when present, may include:

- Fatigue, weakness, irritability
- Headaches, dizziness
- Shortness of breath, chest pain
- Rapid or irregular heartbeat
- Brittle nails; sore mouth or tongue
- Pale skin/gums/nail beds
- Poor temperature regulation; cold hands and feet
- Craving for ice, starch, clay, or other substances
- Restless legs syndrome

HOW IS IT DIAGNOSED?

Blood tests measuring your iron levels, hemoglobin, and red blood cells are used to confirm the diagnosis.

Once the diagnosis has been made, it is important to identify the underlying cause of iron deficiency. If the cause is not obvious, additional testing may be necessary. Looking for bleeding in the colon is especially important in adults over age 50.

WHAT IS THE TREATMENT?

The first step is to identify and treat the underlying cause of iron deficiency. The next step is to give iron. Usually by the time anemia develops, iron supplements are required; simply increasing iron-rich foods is not sufficient. A 2000 calorie diet typically contains about 10 mg of elemental iron, which is enough to prevent iron deficiency in most adults. In contrast, treatment usually requires 150-200 mg of elemental iron per day.

Most patients respond well to iron supplements taken by mouth. If iron deficiency is severe, hospital treatment with blood transfusions and/or intravenous (IV) iron therapy may be necessary.

CHOOSING AN IRON SUPPLEMENT

Iron-only supplements are recommended for the treatment of iron deficiency. Multivitamins containing iron are generally not sufficient for treatment because they contain a much lower dose of elemental iron (18mg or less).

A variety of oral iron supplements are available over-the-counter; however, they should be taken under the supervision of a medical provider because excessive iron intake can lead to serious health problems. Iron-only supplements vary in the amount of iron each contains and are equally effective, except for the ones labeled as enteric coated (EC) or "slow release":

- **Elemental Iron:** When choosing a supplement, look for the amount of elemental iron in each tablet. The milligrams of elemental iron tells you how much iron is actually in the pill, which is different from the number of milligrams of the pill. For example, ferrous sulfate (the cheapest and most common iron supplement available) comes in a 325 mg tablet, which contains 65 mg of elemental iron. Other common iron supplements are listed below.
- **Enteric coated (EC) or "slow release" tablets:** Though they may cause less stomach upset, EC and "slow release" iron tablets are not preferred because they are less easily absorbed by the body. Iron is best absorbed from the duodenum and jejunum (the first and middle parts of the small intestine). EC and slow release tablets do not release iron until further in the intestinal tract, making them less effective. If the pill's coating remains intact through the entire intestinal tract, none of the iron will be absorbed at all.

SUPPLEMENT TYPE	MG TOTAL	ELEMENTAL IRON (MG)	ELEMENTAL IRON (%)
Ferrous Sulfate	325 mg	65 mg	20%
Ferrous Fumarate	325 mg	106mg	33%
Ferrous Gluconate	325 mg	36mg	11%

HOW TO TAKE YOUR IRON

For optimal iron absorption, consider the following:

- Take your iron (1-3 tablets) every other day (or on Mon, Wed, Fri). Recent research suggests that this may be more effective than taking it daily.
- Take your iron with Vitamin C (250mg tablet or half a glass of orange juice). This almost doubles the absorption of iron because iron is best absorbed in a mildly acidic environment.
- Avoid taking iron with foods and medications that decrease iron absorption. Avoid consuming the following for 1-2 hours before or 2-4 hours after taking your iron: antacids, tetracycline antibiotics, calcium supplements, dairy (milk, cheese, yogurt), tea, coffee, eggs, cereals, and dietary fiber.
- Iron can also decrease the absorption of certain medications, including levothyroxine and some antibiotics (fluoroquinolones and tetracyclines).

COMMON SIDE EFFECTS

Stomach upset, nausea, and constipation are common side effects of iron supplements. Iron supplements may also turn your stools black, which can be an alarming but harmless side effect. If you have significant side effects:

- Try a smaller dose of iron.
- Take iron with food (this will reduce the amount of iron your body absorbs, but it is better than nothing).
- Take a stool softener if constipation develops.
- Change to a supplement with a lower dose of elemental iron, such as ferrous gluconate.

DURATION OF TREATMENT

This depends on the cause of iron deficiency. In general, iron supplements should be taken until hemoglobin normalizes, which can take 6-8 weeks. Many clinicians continue treatment until the tests of iron stores return to normal, which typically takes about 6 months. It is important to follow up with your medical provider to monitor response to iron replacement.

RECOMMENDED WEBSITES:

www.mayoclinic.org, www.familydoctor.org

IRON RICH FOODS (Source: US Dept of Agriculture)

Foods	Serving Size	Iron Content	Foods	Serving Size	Iron Content
Breakfast cereals, 100% iron-fortified	¾ cup	18 mg	Pumpkin seeds, roasted	1 oz	2.3 mg
Oatmeal, instant, fortified, prepared with water	1 cup	10 mg	Turkey, dark meat	3.5 oz	2.3 mg
Cream of Wheat	1 cup	8.1 mg	Refried beans, canned	½ cup	2.1 mg
White beans, canned	1 cup	7.8 mg	Pork or beef, cooked	2 oz	2 to 3 mg
Edamame (boiled soybeans)	1 cup	6.6 mg	Whole wheat bread	2 slices	1.8 mg
Lentils, boiled	1 cup	6.6 mg	Enriched white bread	2 slices	1.7 mg
Liver, beef or chicken	2 oz	6 mg	Cashews	1 oz (18 nuts)	1.7 mg
Potato, baked with skin	1 large	4 mg	Raisins	½ cup	1.4 mg
Black/pinto beans, cooked	1 cup	3.6 mg	Tuna, canned in water	3 oz	1 mg
Kidney beans, canned	1 cup	3.2 mg	Broccoli, cooked	1 cup	1 mg
Tofu, firm	½ cup	3 mg	Pistachios, almonds	1 oz	1 mg
Cheese pizza	2 slices	3 mg	Chicken breast, roasted	3.5 oz	1 mg
Chickpeas, canned	1 cup	2.9 mg	Apricots, dried	10 halves	0.9 mg
Hamburger, lean	3.5 oz	2.7 mg	Halibut, cooked	3 oz	0.9 mg
Spinach, raw	3.5 oz	2.7 mg	Popcorn	1 oz	0.86 mg
Green peas, frozen	1 cup	2.4 mg	Egg, cooked	1 large	0.8 to 0.9 mg

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