NUTRITIONAL DEDICIENCY DISORDERS

The body requires many different vitamins and minerals that are crucial for both body development and preventing disease. These vitamins and minerals are often referred to as micronutrients. They aren't produced naturally in the body, so you have to get them from your diet. A nutritional deficiency occurs when the body doesn't absorb or get from food the necessary amount of a nutrient. Deficiencies can lead to a variety of health problems. These can include digestion problems, skin disorders, stunted or defective bone growth, and even dementia. The amount of each nutrient you should consume depends on your age.

Iron deficiency diseases

Iron (Fe) is a component of hemoglobin, myoglobin, and many enzymes in the body. It is contained in meat, egg, pulses, green leafy vegetables.

Iron deficiency is one of the most common mineral deficiencies in the world. It may result from the following:

- Inadequate iron intake, common in infants, adolescent girls, and pregnant women
- Malabsorption (eg, celiac disease)
- Chronic bleeding, including heavy menses and bleeding from GI lesions (eg, tumors)

Chronic bleeding due to colon cancer is a serious cause in middle-aged people and the elderly.

Iron deficiency and iron deficiency anemia are common among elite runners and triathlon athletes (1).
When deficiency is advanced, microcytic anemia develops.
In addition to anemia, iron deficiency may cause pica (a craving for nonfoods) and spoon nails and is associated with restless leg syndrome. Rarely, iron deficiency causes dysphagia due to postcricoid esophageal web.

Diagnosis of iron deficiency involves CBC, serum ferritin and iron levels.

A complete blood count (CBC) is usually the first test a doctor will use. A CBC measures the amount of all components in the blood, including:

- red blood cells (RBCs)
- white blood cells (WBCs)
- hemoglobin
- hematocrit
- platelets

The CBC provides information about your blood that is helpful in diagnosing iron deficiency anemia. This information includes:

- the hematocrit level, which is the percent of blood volume that is made up of RBCs
- the hemoglobin level
- the size of your RBCs

A normal hematocrit range is 34.9 to 44.5 percent for adult women and 38.8 to 50 percent for adult men. The normal hemoglobin range is 12.0 to 15.5 grams per deciliter for an adult woman and 13.5 to 17.5 grams per deciliter for an adult man.

Treatment of iron deficiency involves correcting the cause if possible (eg, treatment of a bleeding intestinal tumor). All people with moderate or severe iron deficiency and some people with mild deficiency require iron supplementation.
Iron may accumulate in the body because of

- Iron therapy given in excessive amounts or for too long
- Repeated blood transfusions
- Chronic alcoholism
- Overdose of iron

Iron overload can also result from an inherited iron overload disease (hemochromatosis), a potentially fatal but easily treatable genetic disorder in which too much iron is absorbed. Hemochromatosis affects > 1 million Americans.

An overdose of iron is toxic, causing vomiting, diarrhea, and damage to the intestine and other organs.
Diagnosis of iron toxicity is similar to that for iron deficiency.
Treatment of iron toxicity often involves deferoxamine, which binds with iron and is excreted in urine.

What is iron deficiency anemia?

Anemia occurs when you have a decreased level of hemoglobin in your red blood cells (RBCs). Hemoglobin is the protein in your RBCs that is responsible for carrying oxygen to your tissues. Iron deficiency anemia is the most common type of anemia, and it occurs when your body doesn't have enough of the mineral iron. Your body needs iron to make hemoglobin. When there isn't enough iron in your blood stream, the rest of your body can't get the amount of oxygen it needs. While the condition may be common, many people don't know they have iron deficiency anemia. It's possible to experience the symptoms for years without ever knowing the cause.

In women of childbearing age, the most common cause of iron deficiency anemia is a loss of iron in the blood due to heavy menstruation or pregnancy. A poor diet or certain intestinal diseases that affect how the body absorbs iron can also cause iron deficiency anemia. Doctors normally treat the condition with iron supplements or changes to diet.

The symptoms of moderate to severe iron deficiency anemia include:

- general fatigue
- weakness
- pale skin
- shortness of breath
- dizziness
- strange cravings to eat items that aren't food, such as dirt, ice, or clay
- a tingling or crawling feeling in the legs
- tongue swelling or soreness
- cold hands and feet

- fast or irregular heartbeat
- brittle nails
- headaches

Causes of iron deficiency anemia

According to the ASH, iron deficiency is the most common cause of anemia. There are many reasons why a person might become deficient in iron. These include:

Inadequate iron intake

Eating too little iron over an extended amount of time can cause a shortage in your body. Foods such as meat, eggs, and some green leafy vegetables are high in iron. Because iron is essential during times of rapid growth and development, pregnant women and young children may need even more iron-rich foods in their diet.

Pregnancy or blood loss due to menstruation

Heavy menstrual bleeding and blood loss during childbirth are the most common causes of iron deficiency anemia in women of childbearing age.

Internal bleeding

Certain medical conditions can cause internal bleeding, which can lead to iron deficiency anemia. Examples include an ulcer in your stomach, polyps in the colon or intestines, or colon cancer. Regular use of pain relievers, such as aspirin, can also cause bleeding in the stomach.

Inability to absorb iron

Certain disorders or surgeries that affect the intestines can also interfere with how your body absorbs iron. Even if you get enough iron in your diet, celiac disease or intestinal surgery such as gastric bypass may limit the amount of iron your body can absorb.

Endometriosis

If a woman has endometriosis she may have heavy blood loss that she can not see because it is hidden in the abdominal or pelvic area.

Diagnosing and treating iron deficiency anemia by yourself can result in adverse health effects due to too much iron in your blood. The complications from too much iron in your blood include liver damage and constipation. If you have symptoms of iron deficiency anemia, talk to your doctor instead.

Kwashiorkor

Kwashiorkor is caused by a lack of protein in the diet. Every cell in your body contains protein. You need protein in your diet for your body to repair cells and make new cells. A healthy human body regenerates cells in this way constantly. Protein is also especially important for growth during childhood and pregnancy. If the body lacks protein, growth and normal body functions will begin to shut down, and kwashiorkor may develop.

The name is derived from the Ga language of coastal Ghana, translated as "the sickness the baby gets when the new baby comes" or "the disease of the deposed child",[5] and reflecting the development of the condition in an older child who has been weaned from the breast when a younger sibling comes.

Kwashiorkor is most common in countries where there is a limited supply or lack of food. It is mostly found in children and infants in sub-Saharan Africa, Southeast Asia, and Central AmericaTrusted Source. A limited supply or lack of food is common in these countries during times of famine caused by natural disasters — such as droughts or floods — or political unrest. A

lack of nutritional knowledge and regional dependence on low-protein diets, such the maize-based diets of many South American countries, can also cause people to develop this condition.

This condition is rare in countries where most people have access to enough food and are able to eat adequate amounts of protein. If kwashiorkor does occur in the United States, it can be a sign of abuse, neglect, or fad diets, and it's found mostly in children or older adults. It can also be a sign of an underlying condition, such as HIV.

The symptoms of kwashiorkor include:

- change in skin and hair color (to a rust color) and texture
- fatigue
- diarrhea
- loss of muscle mass
- failure to grow or gain weight
- edema (swelling) of the ankles, feet, and belly
- damaged immune system, which can lead to more frequent and severe infections
- irritability
- flaky rash
- shock

If kwashiorkor is suspected, your doctor will first examine you to check for an enlarged liver (hepatomegaly) and swelling. Next, blood and urine tests may be ordered to measure the level of protein and sugar in your blood. Other tests may be performed on your blood and urine to measure signs of malnutrition and lack of protein.

Kwashiorkor can be corrected by eating more protein and more calories overall, especially if treatment is started early. You may first be given more calories in the form of carbohydrates, sugars, and fats. Once these calories provide energy, you will be given foods with proteins. Foods must be introduced and calories should be increased slowly because you have been

without proper nutrition for a long period. Your body may need to adjust to the increased intake. Your doctor will also recommend long-term vitamin and mineral supplementation to your diet.

What are the complications of kwashiorkor?

Even with treatment, children who have had kwashiorkor may never reach their full growth and height potential. If treatment comes too late, a child may have permanent physical and mental disabilities.

If left untreated, the condition can lead to coma, shock, or death.

MARASMUS

Marasmus is a form of severe malnutrition. It can occur in anyone who has severe malnutrition, but it usually occurs in children. It typically occurs in developing countries. Marasmus can be life-threatening, but you can get treatment for it.

The main symptom of marasmus is being underweight. Children with this condition have lost a lot of muscle mass and subcutaneous fat. Subcutaneous fat is the layer of fat just under the skin. Dry skin and brittle hair are also symptoms of marasmus.

In children with marasmus, the following can also occur:

- chronic diarrhea
- respiratory infections
- intellectual disability
- stunted growth

Seriously malnourished children may look older and have little to no energy or enthusiasm for anything. Marasmus can also make children short-tempered and irritable, but this is usually a more common symptom of kwashiorkor. Kwashiorkor is another form of serious malnutrition.

Kwashiorkor causes a buildup of fluid in the body that can cause the face to become round and the belly to become distended.

A doctor can often make a preliminary diagnosis of marasmus through a physical exam. Measurements, such as height and weight, can help determine whether a child has marasmus. Marasmus is difficult to diagnose using blood tests. This is because many children with marasmus also have infections that can affect blood test results.

initial treatment of marasmus often includes dried skim milk powder mixed with boiled water. Later, the mixture can also include a vegetable oil such as sesame, casein, and sugar. Casein is milk protein. The oil increases the energy content and density of the mixture. Once a child starts to recover, they should have a more balanced diet that meets their nutritional needs.

With proper nutrition and medical care, the outlook can be a positive one. Relief workers can provide food and healthcare to regions where marasmus and other malnutrition problems are common.

S. No.	Vitamin	Deficiency diseases
1)	Thiamine (B_1)	Beriberi
2)	Riboflavin (B_2)	Glossitis
3)	Niacin (B_3)	Pellagra
4)	Pyridoxine (B_6)	Anaemia
5)	Cyanocobalamine (B_{12})	Pernicious anaemia
6)	Folic acid (B_9)	Anaemia
7)	Pantothenic acid	Burning feet
8)	Biotin	Nerves disorders
9)	Ascorbic acid (Vitamin C)	Scurvy
10)	Retinol (Vit. A)	Eye and Skin diseases – Night blindness, Xerophthalmia, Rupture of cornea, Scale formation on skin
11)	Calciferol (Vit. D)	Rickets, fragile bones
12)	Tocoferol (Vit. E)	Fertility disorders – Sterility in males, Abortions in females
13)	Phylloquinone (Vit. K)	Blood clotting

Beriberi- Affects the cardiovascular and nervous system.

Symptoms: increased heart rate, severe lack of energy or constant fatigue, shortness of breath, waking at night due to shortness of breath, swelling in the legs and feet.

Glossitis refers to inflammation of the tongue. The condition causes the tongue to swell in size, change in color, and develop a different appearance on the surface.

Pellagra is marked by dementia, diarrhea, and dermatitis, also known as “the three Ds”. If left untreated, **pellagra** can be fatal.

Pernicious anemia caused by an inability to absorb the vitamin B-12 needed for your body to make enough healthy red blood cells. This type of **anemia** is called “**pernicious**” because it was once considered a deadly disease.

Scurvy symptoms include weakness, feeling tired and sore arms and legs. Without treatment, decreased red blood cells, gum disease, changes to hair, and bleeding from the skin may occur.

Xerophthalmia – eyes fail to produce tears. This damage may take the form of white spots on your eyes and ulcers on your corneas.

People with **rickets** may have weak and soft bones, stunted growth, and, in severe cases, skeletal deformities.

What is iodine deficiency?

You need a certain amount of iodine in your body in order for it to make a chemical known as **thyroid hormone**. Thyroid hormone controls your metabolism and other important body functions.

Low levels of iodine are not the only cause of low thyroid function. But a lack of iodine can cause an abnormal **enlargement of the thyroid gland, known as a goiter**, and other thyroid problems. In children, it can cause **mental disabilities**.

Your body doesn’t naturally make iodine, so the only way to get this nutrient is through your diet. Adults typically require 150 micrograms (mcg) per day. Pregnant and breastfeeding women need 200 mcg per day. Iodine is found in many types of foods. It’s most concentrated in foods like: fish, eggs, nuts, meat, bread, dairy products, seaweed, iodized table salt. Iodine deficiency affects about 2 billion people worldwide. It’s most common in developing countries where people may lack access to enough healthy food. But it can also affect people in developed countries who lack an adequate diet or whose bodies don’t correctly process iodine.