Iron Studies

Description:

Iron Studies is a group of blood tests used to assess and know the level of total iron-binding capacity, elemental iron, transferrin saturation, and UIBC transported in the bloodstream and retained in body tissues. A serum iron, percent saturation, and TIBC test help detect an iron deficit. It also aids in the diagnosis of iron overload.

Sample type:

Blood

Fasting Required:

No

Alias:

Iron Studies Panel, Iron Blood Tests, Serum Iron Test, Iron Panel, Iron Profile

Risk Assessment:

Iron Deficiency Anaemia, hemochromatosis, chronic iron deficiency, tissue inflammation states, extensive malignancies

Overview

Iron is essential for the formation of red blood cells. Iron is present in hemoglobin, a protein in human blood that assists in transporting oxygen from your lungs to other parts of the body. Iron is crucial for healthy bone marrow, muscle, and organ function. Too much or too little iron can cause serious health problems.

The **Iron Studies** Package measures three parameters in the blood, i.e., transferrin saturation, serum iron, and total iron-binding capacity. The transferrin saturation is the percentage ratio of the serum iron concentration to the TIBC. A serum iron assay determines the amount of iron in the blood. The serum is the fluid that remains after clotting factors and after the elimination of red blood cells from the blood.

The test also measures TIBC or Total Iron Binding Capacity. The total iron-binding capacity (TIBC) assessment will determine iron deficiency anemia and other iron metabolism problems. Transferrin's iron-binding capacity is its ability to bind iron. There are two forms of iron-binding capacity: UIBC (unsaturated iron-binding capacity) and TIBC. Transferrin levels in the circulation rise when iron reserves are less.

Symptoms indicating abnormal hemoglobin values call for an **Iron Studies** Package. Other symptoms such as weakness, extreme fatigue, pale skin, fast heartbeat, brittle nails, chest pain, shortness of breath, headache, lightheadedness or dizziness, cold feet and hands, soreness or inflammation of your tongue, desires for non-nutritive things such as dirt, starch, ice, and appetite loss, specifically in kids with iron-deficient anemia, indicate an unusual amount of iron in the body. The tests under the **Iron Studies** Package diagnose an anemic condition.

The tests under the **Iron Studies** Package are also prescribed if there is memory fog, grey or bronze skin color, liver failure, heart failure, impotence, loss of sex drive, diabetes, weakness, fatigue, abdominal pain, and joint pain. This condition can be due to hemochromatosis. The results of the **Iron Studies** can determine whether a person has anemia (low red blood cell or hemoglobin concentrations below the normal range), hemochromatosis (iron overload), or any other iron-related disorder.

Iron deficiency anemia is endemic in some regions of India with malnutrition and poverty. Iron deficiency anemia is the most widespread and severe nutritional condition in India. The native vegetarian diet is primarily responsible for India's higher incidence of iron-deficiency anemia. If there is less iron intake in the diet, iron deficiency anemia can occur.

Women are more vulnerable to iron deficiency because they suffer from blood loss during menstruation; females are more susceptible to iron deficiency anemia. Infants who do not receive adequate iron through breast milk, or those delivered at a low birth weight or prematurely, are at risk of iron deficiency.

Tests under **Iron Studies** are crucial during pregnancy, as abnormal iron concentration can affect the health of the mother and fetus. Iron deficiency anemia occurs in several pregnant females without iron supplements since their iron stores must feed their increasing blood volume and be a hemoglobin source for the growing fetus.

Sample Type

The **Iron Studies** Package findings depend on evaluating a blood sample. All three tests in the **Iron Studies** Package are conducted on a single sample.

How frequently should you take tests under **Iron Studies**?

A random test under the **Iron Studies** Package helps diagnose iron deficiency anemia, hemochromatosis, or other conditions. If the **Iron Studies** findings confirm a diagnosis, proper treatment should be done. The package should be used and repeated every year, at a minimum, when an individual is on medicines for an iron deficiency to evaluate the efficacy of ongoing treatment. If you are not taking any medications or your prior **Iron Studies** results were normal, you can only use the **Iron Studies** package once a year.

Other names of the **Iron Studies** Package

- **Iron Studies** Panel
- Iron Blood Tests
- Serum Iron Test
- Iron Panel
- Iron Profile

Test inclusions: What parameters are included in the **Iron Studies** Package?

The **Iron Studies** Package includes the following variables:

- Transferrin Saturation
- Serum Iron
- Total Iron Binding Capacity

Only these three variables are considered in this package. These parameters give an idea about the presence of iron in the body and if its abnormal concentration is affecting other organs or organ functions. The **Iron Studies** Package findings are neither positive nor negative. If the result is on the upper or lower end of the scale, it indicates an iron disorder. This package cannot assess body changes or organ level changes caused by iron deficiency.

What does the **Iron Studies** Package detect/measure? For whom is this prescribed?

The test under **Iron Studies** Package measures the levels of three components - Transferrin Saturation, Serum Iron, and Total Iron Binding Capacity.

An abnormal concentration of iron is indicated if an individual is experiencing the following signs and symptoms:

- Weakness
- Extreme fatigue
- Pale skin
- Fast heartbeat
- Brittle nails
- Chest pain
- Shortness of breath
- Headache
- Lightheadedness or dizziness

- Cold feet and hands
- Soreness or inflammation of your tongue
- Desires for non-nutritive things such as dirt, starch, ice
- Appetite loss, specifically in kids with iron-deficient anemia
- Memory fog
- Gray or bronze skin color
- Liver failure
- Heart failure
- Impotence
- Loss of sex drive
- Diabetes
- Weakness
- Fatigue
- Abdominal pain
- Joint pain

The **Iron Studies** Package, among other packages, is recommended by the consulting doctor for persons with such complaints.

Some disorders for which the tests under **Iron Studies** Package are recommended are:

- Liver damage
- Liver cirrhosis (the last stage of liver disease)
- Pancreatic islet cell damage
- Diabetes
- Hypothyroidism (underactive thyroid)
- Hypogonadism (decreased gonadal functional activity)
- Crohn's disease (s type of inflammatory gastrointestinal disease)
- Ulcerative colitis (inflammation and sores in the digestive tract)

The **Iron Studies** Package may be recommended every six months after a diagnosis to evaluate and manage the dose of iron deficiency anemia or hemochromatosis. The test included in the **Iron Studies** Package is advisable for both men and women, adults and children.

The **Iron Studies** Package findings may assist your physician in continuing the same medication or modifying the dosage of existing medications. Tell your doctor about all the ongoing medications. Iron concentrations in plasma samples may be falsely raised if kits intended for serum iron assays are used to assess iron in plasma.

Test preparation for **Iron Studies** Package

The **Iron Studies** Package includes a blood test that requires no fasting or other preparation. A blood sample is often obtained by drawing it from one vein. This vein is commonly the most visible in a person's forearm. This procedure takes 5 minutes to complete.

Ranges for the **Iron Studies** Package

	Normal Range
Transferrin Saturation	20-50%
Serum Iron	60-170 mcg/dL
Total Iron Binding Capacity	240-450 mcg/dL

Normal levels may change slightly between men and women, but the range stays consistent.

Interpretation of the results of the **Iron Studies** Package

The main component of the **Iron Studies** Package is serum iron. If the serum iron value is lower than the normal range, it implies the iron is present in an inadequate quantity. An abnormally low iron concentration may indicate that you haven't ingested adequate iron or that your system is not absorbing it effectively. Excessive menstrual cycles can even result in low iron concentration. Low iron levels may indicate anemia.

Unusually elevated iron serum concentrations may indicate an excess of iron, vitamin B-12, or vitamin B-6. High iron concentrations may suggest hemolysis or hemolytic anemia, which means your body does not have adequate healthy red blood cells, indicating liver disorders such as hepatitis (liver inflammation) and liver necrosis (hepatic failure).

Transferrin levels rise in iron deficiency and protein-energy malnutrition but fall in iron deficiency. There will be several free transferrins in the circulation when there is not much iron to be attached. A high TIBC indicates that a person has low iron concentrations.

A low TIBC indicates that there is not sufficient transferrin present to attach to iron. In other words, since your iron concentrations are increased, much of the transferrin is linked to it, leaving relatively little available in the blood. Increased iron concentrations can be due to several disorders, such as iron poisoning.

FAQs

Q1. What factors may impact iron test results?
Ans. Antibiotics, estrogens and birth control pills, cholesterol medications, blood pressure medications, deferoxamine (which eliminates iron overload from the system), gout medications, and testosterone can all impact test results.

Q2. What if my Transferrin Saturation percentage is fine, but my serum iron is high?

Ans. You may have a disorder known as chronic anemia (also called anemia of inflammatory response). The hemoglobin level in this iron disease is often low.

Q3. What if my serum ferritin levels have dropped, but my Transferrin Saturation percent is high?
Ans. This is known as iron avidity, commonly found in patients with typical hemochromatosis (primarily owing to severe bleeding) and people who are iron-lacking, mainly females of childbearing age.

Q4. Is there any risk associated with **Iron Studies**?
Ans. Having a blood test poses relatively little harm. You may experience bruising or pain when the needle is inserted, but most complaints will go away soon.

Q5. What additional factors influence the level of transferrin?
Ans. Transferrin is a protein known as a negative acute phase reactant since it decreases throughout any inflammatory event. Transferrin levels can be affected by chronic infections, inflammation, and cancer.

Q6. Can I drink water before doing tests under **Iron Studies**?
Ans. Water does not affect these iron test results. Therefore, you can drink water before it.

Reference links

https://bmjopen.bmj.com/content/11/7/e046865.abstract
https://www.sciencedirect.com/science/article/pii/S0037196318300532
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