

Anaemia in pregnancy

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Definition: Anaemia is defined as reduction in circulating haemoglobin mass below the critical level. The normal haemoglobin (Hb) concentration in the body is between 12-14 grams percent. WHO has accepted up to 11gm percent as the normal haemoglobin level in pregnancy. Therefore any haemoglobin level below 11gm in pregnancy should be considered as anaemia. However in India and most of the other developing countries the lower limit is often accepted as 10 gms percent.

Degree of Anaemia: Anaemia is often classified as mild degree (9-11 gm %), moderate (7-9 gms %), severe (4-7 gm %) and very severe (<4gm %). It is also classified according to Haematocrit (PCV) %.

Incidence: Anaemia in pregnancy is present in very high percentage of pregnant women in India. Exact data is not available about the prevalence of nutritional anaemia. However according to WHO, the prevalence of Anaemia in pregnancy in south East Asia is around 56%. In India incidence of anaemia pregnancy has been noted as high as 40-80%.

Magnitude of the problem: Pregnancy anaemia is one of the important public health problems not only in India but also in most of the south East Asian countries. About 4-16% of maternal death is due to anaemia. It also increases the maternal morbidity, fetal and neonatal mortality and morbidity significantly.

Anemia in pregnancy is a condition with effects that may be deleterious to mothers and fetuses. Indeed, it is a known risk factor for many maternal and fetal complications.

Maternal risk during Antenatal period: poor weight gain. Pre term labours, PIH, placenta previa, accidental Hg, eclampsia, premature rupture of membrane (PROM) etc.

Maternal risk during intranatal period: Dysfunctional labour, intranatal hemorrhage, shock, anesthesia risk, cardiac failure

Maternal risk during postnatal period: Postnatal sepsis, sub involution, embolism

Fetal and Neonatal risk: Complications include prematurity, low birth weight, poor Apgar score, fetal distress, neonatal distress requiring prolonged resuscitation, and neonatal anemia due to poor reserve. Infants with anemia have higher prevalence of failure to thrive, poorer intellectual developmental milestones, and higher rates of morbidities and neonatal mortalities than infants without anemia. Moreover, babies whose mothers had AIP during their first trimester *in utero* experienced higher rates of cardiovascular morbidities and mortalities in their adult lives than babies whose mothers did not have AIP.

Causes:

1) Physiological – Pregnancy causes a state of hydraemic plethora. There is disproportionate increase of plasma volume during pregnancy leading to apparent reduction of RBC, haemoglobin and haematocrit value. Hb is consequently reduced to a varying extent occasionally as low as 80%. The dilution picture is normochromic and normocytic. This is so called physiological anaemia.

2) Acquired- Nutritional

- a) Iron deficiency anaemia (60%),
- b) Macrocytic anaemia (10%) due to deficiency of folic acid and/or vitaminB₁₂
- c) Dimorphic and protein deficiency anaemia (30%) both due to deficiency of iron and folic acid and /or vitaminB₁₂
- d) Protein deficiency –due to protein deficiency in extreme malnutrition

Hemolytic or Haemorrhagic (due to acute blood loss,; chronic (hook worm, bleeding piles)

Iron and folate deficiency is by far the most important aetiological factor. Haemolytic anaemia may be caused by haemoglobinopathies, drug reaction or infestation with malaria parasites.

Risk factors

- Sociodemographic factors (age, level of formal education, marital status, areas and cities of residence)
- Obstetrical factors (gravity, parity, history of previous preterm or Small-for-gestational-age deliveries, plurality of pregnancy—multiple Or singleton)
- Behavioral factors (smoking or tobacco usage, alcohol usage, utilization of prenatal care services)
- Medical conditions (diabetes, renal or cardio-respiratory diseases, chronic hypertension AIP—anemia in pregnancy)

Clinical presentation:

To start with the pregnant women with anaemia may not have any symptom as the body system get adjusted to reduce haemoglobin mass. However she may represent with vague complain of ill health, fatigue, loss of appetite, digestive upset, dyspnoea, palpitation etc. Clinical examination may reveal pallor, pale nails, koilonychias, pale tongue etc. In severe cases there may be oedema also.

Investigations:

Haemoglobin estimation and study of peripheral smear is good indicator for diagnosis of anaemia. There may be several methods for estimation of Hb. However inspite of limitation of present method of Hb estimation, it is a useful method of diagnosis for anaemia.

Peripheral smear examination is another simple method for diagnosis of anaemia. If the peripheral smear looks pale, there is hypochromia (large central vacuoles) and microcytosis (small deformed red cells). It suggests iron deficiency. In case of megaloblastic anaemia, there would be microcytosis, hyper segmentation of neutrophils and fully haemoglobinised red blood cells. In Haemolytic anaemia there would be polychromatic cells, stippled cells and target cells.

Other special laboratory investigations total iron binding capacity (TIBC), serum ferritin (SF), serum folic acid, bone marrow studies are not available every where and expensive. Therefore they are not for routine use to diagnose pregnancy anaemia.

Management:

A pregnant woman requires about 2 to 4.8 mg iron every day. To have it from the dietary sources she must consume 20-48 mg of dietary iron. This is practically impossible in India because of average vegetarian diet does not contain more than 10-15 mg of iron and the phytate content in it further reduces iron absorption. Moreover majority of Indian women enter pregnancy already with iron depleted condition. The iron store is markedly diminished when there is fall in Hb values. Therefore in India there is a need for routine iron supplementation to all pregnant women.

Prophylaxis:

It is advisable to build up iron store before a woman marries and becomes pregnant. This can be achieved by

- 1) Routine screening for anaemia for adolescent girls from school days
- 2) Encouraging iron rich foods
- 3) Fortification of widely consumed food with iron
- 4) Providing iron supplementation from school days
- 5) Annual screening for those with risk factors

Iron rich foods: Pulses, cereals, jaggery, Beet root, Green leafy vegetables, meat, liver, egg, fish, legumes, dry beans, and iron enriched white breads etc.

Oral Iron therapy:

Oral Iron is safe, inexpensive & effective way to administer iron. Oral route should be the route of choice in routine cases.

Parenteral route of iron therapy should only be considered when oral route is not possible due to any reason. If all pregnant women receive routine iron and folic acid, it is possible to prevent nutritional anaemia in pregnant women. National nutritional anaemia prophylaxis program advises 60milligrams elemental iron and 500 micrograms of folic acid daily for 100 days to all pregnant women. However it is suggested that 120 milligram of elemental iron and 1 milligram folic acid are the optimum daily doses needed to prevent pregnancy anaemia. The higher dose in Indian women is required as they start pregnancy with low or absent iron stores due to poor nutrition and frequent infection like hook worm and malaria.

How to select the iron salt:

There are many iron preparations available in the market and a clinician is often confused as to which iron preparation should be advised to the patient. Ferrous sulphate is least expensive and best absorbed form of iron.

It also allows more elemental iron absorbed per gram administered. If for some reasons this is not tolerated, then ferrous gluconate, fumarate are the next choice for iron therapy.

However the iron salt should be selected based on compliance of the patient, tolerance, side effects, clinical situation of the patient and availability of a particular salt.

Oral iron must be continued for 3-6 months after haemoglobin has come to normal levels. This helps in building iron stores.

Timing of oral iron intake in relation to food:

It is true that if iron is taken with food there is some reduction in side effect related to GI Tract. However staple Indian diet consists of cereals and cereals contain phytic acid. Phytate reduce iron absorption. Addition of vitamin C in medicine or in the diet enhances iron absorption.

If the predictable rise in haemoglobin does not occur after oral iron therapy, one must find out the possible reasons. Some of the reasons are as follows –

1. Incorrect diagnosis.
2. Mal-absorption syndrome
3. Presence of chronic infection
4. Loss of iron from the body
5. Lack of patients compliance
6. Ineffective release of iron from a particular preparation

Parenteral Iron:

The indications for parenteral iron therapy are as follows –

1. Cannot tolerate side effects of oral iron
2. Suffers from inflammatory bowel disease
3. Patient does not comply
4. Patient near term

The defaulting rate with oral iron therapy in pregnant women is fairly high because of gastrointestinal side effects like nausea, vomiting, diarrhoea and abdominal pain. Sometimes pregnant women present with severe anaemia after 30-32 weeks of pregnancy and in those cases time is an important factor to improve haemoglobin status. In such situations parenteral iron therapy is indicated. Parenteral iron can be given by **intramuscular or intravenous route**. Iron- sorbitol -citric acid complex (jectofer (1.5ml) 75mg is used for intramuscular route only. On the other hand iron-dextran can be used both by intramuscular and intravenous route. The main drawback of

intramuscular iron is the pain and staining of the skin at injection site, myalgia, arthralgia and injection abscess.

Intravenous route should be reserved for those who do not wish to have frequent intramuscular injections.

Iron can be given intravenously at one shot as total dose infusion (TDI). Utmost caution is needed for total dose iron therapy via intravenous route because of severe anaphylactic reaction that may occur.

TDI reaction: Immediate vascular collapse, tachycardia, dyspnoea, cyanosis vomiting, pyrexia etc.

Therefore total dose of iron therapy by intravenous route should only be given in a hospital setting where facilities are available to manage severe reaction after iron dextran.

How to calculate TDI: total dose of infusion of iron is calculated as: $(15 - \text{patient's Hb\%}) \times \text{body weight in Kg} \times 3 = \text{Mg}$.

Contraindication of parenteral iron therapy: Nephritis, cardio respiratory disease, allergy

Severe anaemia in late pregnancy (after 32 weeks):

These patients should ideally be managed in a hospital setting. They may or may not present with heart failure. However they all need urgent admission and bed rest. They need complete rest with sedation, oxygen. In case, of CCF patient should be given digitalis, diuretics and packed red cells. Packed red cells are preferred choice for severe anaemia in later part of pregnancy. This should be infused along with diuretics. Once the patient is stabilized total dose infusion of iron Dextran may be considered.

Management of endemic infection

Malaria and hook worm infection are major factor causing anaemia in pregnancy due to haemolysis and Chr. Blood loss respectively. Malaria causes low birth wt. babies, parasitaemia in neonates, haemolysis of RBCs and becomes a persistent source of infection. Therefore one should not hesitate to treat malaria in pregnancy. The preferred drug is chloroquine. Malaria prophylaxis should also be given to pregnant women in areas where malaria is endemic. Like wise Albendazole or mebendazole is recommended to all pregnant women after the first trimester of pregnancy. To prevent recurrence, patients should be advised to use footwear, improve sanitation, and personal hygiene.

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