

Preventing Iron Deficiency and Anaemia

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Anaemia, often due to iron deficiency, is one of the most widespread causes of mortality and morbidity in Southern Sudan, which probably has probably one of the highest rates in the world.

Anaemia means a person has a haemoglobin or haematocrit below the values in Table 1. It occurs when the body produces too few healthy red blood cells, loses too many or destroys them faster than they can be replaced.

Causes of anaemia and iron deficiency

Anaemia is caused one or more of the following:

- **Iron deficiency** that accounts for about 50% of anaemia cases worldwide. **Iron deficiency** is caused by:
 - a diet low in bioavailable iron.
 - loss of blood due to heavy menstruation, injuries, bleeding during delivery, or hookworm or schistosomiasis infections.
 - intestinal disorders affecting iron absorption.
- **Deficiency of vitamin B12, vitamin A and/or folate.** Folate deficiency causes megaloblastic anaemia. Folate needs are high during pregnancy.
- **Non nutritional causes** such sickle cell disease and **infections** especially malaria, HIV/AIDS.

Anaemia is common among young children and women of reproductive age because:

- Young children are growing fast and so must make new red blood cells quickly.
- Women and girls of reproductive age lose blood each month.
- Pregnant women must make many new red blood cells, provide iron for the foetus and may lose much blood during childbirth.

Dangers of anaemia and iron deficiency

- Severely anaemic people, including children, often die.
- Anaemia in pregnancy results in:
 - less iron passing from mother to foetus so the newborn has low iron stores
 - increased risk of blood loss during and after delivery, and of maternal death

- increased risk of the baby being preterm, having a low birth weight and dying.
- Anaemia in surgical patients increases the risk of postoperative problems and death.

Some people may not be classified as 'anaemic' but are iron deficient. **Iron deficiency** (even without anaemia) reduces the immune status of all age groups and:

- Iron-deficient young children are apathetic and less active, and at risk of poorer-than-normal emotional and behavioural development.
- Iron-deficient older children and adults have poorer-than-normal ability to concentrate or do physical work for long periods.

Diagnosing iron deficiency and anaemia

Biological methods

The methods usually available in Southern Sudan to diagnose anaemia are haemoglobin (see Table 1), mean corpuscular volume (MCV) and mean corpuscular haemoglobin concentration (MCHC).

However, these can give misleading results if there is infection and do not necessarily mean a person is iron deficient.

People with infections especially HIV or other serious infections are often anaemic but may not be iron deficient. In the immune response to infection the body takes iron from the blood and stores it in the liver. Giving iron to these patients may be dangerous. Tests for iron deficiency include serum ferritin, serum transferrin receptor and zinc protoporphyrin (ZnPP). Refer patients with HIV or other serious infections for one of these tests when possible, or seek senior opinion.

Table 1. Haemoglobin and haematocrit cut-off levels for anaemia¹

Age/Sex	Haemoglobin (Hb) below	Haemato crit below
	g/L	%
6– 59 months	110	33
5 – 11 years	115	34
12 – 14 years	120	36
Females >15 yrs:		
- not pregnant	120	36
- pregnant	110	33
Males >15 years	130	39

- In adults and adolescents: if haemoglobin is: <90 g/L anaemia is 'moderate'; <70 g/L (or haematocrit <20%) anaemia is 'severe'; <40 g/L anaemia is 'life threatening'.
- Anaemia is classified as a public health problem if 40% or more of pregnant women have a haemoglobin below 110 g/L.

Physical examination

- Check for pallor in the palms, nails, inner eyelids and tongue. **Severe anaemia** is indicated if any of these is abnormally pale.

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- An *indication* of **iron deficiency** is flaking and thinning, and later spooning, of fingernails and/or a diet low in available iron – see Box 1.

Ask about symptoms

An anaemic person may complain of:

- Feeling tired, ill, dizzy, or breathless when resting.
- Headache, fast-beating heart or swollen feet.

Find possible causes

- Ask about the diet, especially about foods that are iron-rich and/or increase or reduce iron absorption – see Box 1.
- Ask about heavy bleeding or chronic blood loss.
- Examine or ask about present or previous severe infection such as HIV, malaria or tuberculosis,
- Examine for intestinal parasites and ask if person has been de-wormed.

Preventing iron deficiency and anaemia

- Help families and communities to understand the causes and dangers of **iron deficiency and anaemia**.
- Explain that:
 - women need adequate iron stores before and during pregnancy - because of increased needs and to ensure babies are born with good stores. Their need for folate also increases.
 - spacing births gives women a chance to 'fill up' iron stores between pregnancies.
 - breastfeeding exclusively for 6 months – which, among other benefits to mother and baby, delays menstruation.
 - young children should not be fed unfortified commercial milk.
- Discuss practical ways to improve diets, particularly for women and young children (see below).
- Give prophylactic iron and folic acid supplements to iron deficient persons.
- Prevent or treat non-dietary causes of anaemia.

During and after childbirth:

- Control bleeding by encouraging women to:
 - be delivered by a trained birth attendant or at a maternity unit if there is a risk of complications.
 - start breastfeeding within ½ hour of birth. Breastfeeding makes the mother's uterus tighten and reduces bleeding.
- Wait two minutes after birth before clamping the umbilical cord so the baby gets more blood from the placenta.

Give prophylactic supplements

- Give oral iron and folic acid supplements to pregnant and lactating women, to females of

reproductive age and to low birth weight babies – see Table 2.

- Do not give *routine prophylactic* iron or folic acid to children in malaria endemic areas as it may increase adverse effects and mortality unless they are proven to be iron-deficient².
- Explain the importance of taking supplements regularly for the full duration and how to deal with possible side effects – see Box 2.

Box 1. Improving diets

There are two forms of iron in foods:

Haem iron is type of iron in the blood, muscle and organs of animals, poultry, and fish – see pictures.



Non-haem iron is the type of iron in plants, milk, and eggs.



Non-haem iron in breast milk is well absorbed but is poorly absorbed from most other foods — usually about 5% to 10%. However the proportion absorbed depends on:

- *Other foods in the meal.* Meat, fish and vitamin C-rich foods (fresh fruits and vegetables) increase absorption. Fermenting and germinating/malting cereals and legumes also improve absorption. Some foods contain anti-nutrients that decrease absorption if taken with, or immediately after, foods containing non-haem iron. These include tannins in tea and coffee and phytates in cereals.
- *Iron needs.* People with high iron needs (e.g. pregnant women or people with anaemia) absorb more than other people.

To prevent iron deficiency advise families to:

- Eat more meat (of any kind), fish, poultry and organ meats – the darker red the food the more haem iron it contains. These foods must be well cooked to kill parasites and pathogens.
- Eat more fresh vegetables and fruits (to increase absorption of non-haem iron from other foods in a meal). Foods high in non-haem iron include egg yolk, dark green vegetables, millet, sorghum and legumes.
- Avoid drinking tea or coffee with or soon after meals. Do not give tea and coffee to children.
- Eat fermented porridges and germinate/malt cereals and legumes to reduce phytates.
- Eat foods fortified with iron if feasible, such as some wheat flours. Families can use home fortification products if available.
- Breastfeed babies exclusively for 6 months and then to include iron-rich foods such as suitably prepared meat or fish in their diets.

Table 2. Prophylactic oral iron and folic acid dosage schedules to prevent and correct iron deficiency anaemia^{1,3,4}

Group	Dosage/day ^a	Duration
Low birth weight infants <2500g	1 to 2 mg iron/kg body weight + 50 µg folic acid	2-24 months of age
Children 6-24 months.	2 mg iron/kg body weight + 50 µg folic acid ^b . Give on physician's advice.	6-12 months of age where anaemia prevalence is not high. 6-24 months of age where anaemia prevalence is high
Children 24-59 months	20-30 mg iron	At least once a week for 3 months every year
Children 6-11 years	30-60 mg iron	At least once a week for 3 months every year
Adolescents and women of reproductive age	60 mg iron + 400 µg folic acid ^b (folic acid helps prevent birth defects)	At least once a week for 3 months every year – or whatever routine is feasible
Women pregnant ^c and lactating	60 mg iron + 400 µg folic acid ^b	6 months during pregnancy and 3 months postpartum.

- a Iron tablets usually contain 60 mg iron and folic acid tablets 400 µg folic acid. Iron syrup usually contains 20 mg iron/ml. Check before prescribing.
- b Do not give folic acid if the person is taking sulphur-based drugs including sulfadoxine-pyrimethamine (Fansidar) for malaria as it may interfere with the action of the antimalarial.
- c A *pregnant* woman should stop taking folic acid for one week after taking a dose of Fansidar.

Box 2. Problems with iron supplements

People may not take supplements regularly or for prescribed periods because:

- They do not understand why they should and they feel better after a few days. *So:* Explain that iron stores take a long time to 'fill up'.
- They get side effects such as stomach-ache, nausea, vomiting, constipation or diarrhoea. *So:* Warn of possible side effects and advise to take tablets with food or halve the dose for a few days.
- Stools are black. *So:* Explain that iron makes stools black and is harmless.
- Pregnant women believe iron makes their babies bigger and so delivery will be more difficult. *So:* Explain that iron makes mothers and newborns stronger and less likely to die during childbirth.

An overdose of iron can **kill** so warn recipients that they *must* take pills or syrups as prescribed. Young children can choke on tablets. **Strongly advise families to keep tablets and syrups out of children's reach.**

Treating severe anaemia

If the person is anaemic and the cause *is* iron deficiency, treat with iron and folic acid (see Table 3) and counsel on side effects (see Box 2.) – unless a transfusion is needed. Counsel on diet.

Table 3. Iron and folic acid dosages for treating severe anaemia³

Group	Daily dose		Duration
	Iron mg	Folic acid µg	
Under 2 years	25	100-400	3 months
2 –12 year	60	400	3 months
Adolescents and adults including pregnant women	120	800	3 months

- After completing 3 months of therapeutic supplementation, pregnant women and infants should continue the preventive supplementation schedule in Table 2
- Do not give folic acid if the person is taking sulphur-based drugs such as Fansidar.

Treating malnourished children

Most children with severe acute malnutrition are severely anaemic but it is dangerous to give oral iron until the child has been treated for infections, regains appetite and starts gaining weight^{4: y}

Treating anaemia when there may be infection

- It is recommended *not to give iron* to people diagnosed as anaemic (by haemoglobin level) but who are *not* iron deficient. The cause of anaemia is likely to be infection and iron can make infections worse.
- If you diagnose or suspect that the person has an *acute* infection and you cannot measure iron stores, do not give iron but treat the infection. Follow up and give iron if the haemoglobin does not improve.
- If there is no infection or you are not sure, give iron, follow up and check to see if the haemoglobin improves. If it does not, look for and treat other causes of anaemia.
- People with severe chronic infections are often severely anaemic but *may* have good iron stores. Giving iron supplements to these people can be dangerous, especially if they have malaria, tuberculosis or HIV. Instead treat with erythropoietin if available. If this is not available, give iron (because *severe* iron deficiency anaemia can be life-threatening) but follow-up closely.

^y In severely malnourished children the blood may have too little protein to bind the iron. Unbound iron can damage cell walls and stimulate the growth of pathogenic bacteria.

Note: We plan to cover the management of anaemia due to non-dietary causes in future issues.



A good diet prevents iron deficiency anaemia

From Nutrition during pregnancy and lactation. Job Aids on HIV and Infant Feeding. University Research Co., LLC/Quality Assurance Project <http://www.qaproject.org/strat/stratHIVjobaidsintro.htm>

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