Prevention and Control of Nutritional Anaemia: A South Asia Priority
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Cover photo: Young South Asian mother feeding her anaemic child
Photo: Miriam Krantz/UNICEF-RO SA

2002
United Nations Children’s Fund - Regional Office for South Asia

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Prevention and Control of Nutritional Anaemia: A South Asia Priority

What is Nutritional Anaemia, What Causes it, and How is it Measured?

Anaemia is the decreased ability of the red blood cells to provide adequate oxygen to body tissues. It may be due to a decreased number of red blood cells, a decreased amount of substance in red blood cells, which transports oxygen (hemoglobin), or a decreased volume of red blood cells. There are over a dozen different types of anaemia, some due to a deficiency of either a single or several essential nutrients and others from conditions that are not related to nutrition such as infections. People throughout the region suffer from non-nutritional anaemias (such as sickle-cell anaemia and thalassaemia, which are induced by genetic disorders), but these are few in comparison to the number of people—children, women and men with nutritional anaemia. “Nutritional Anaemia” describes a condition in which the haemoglobin or red blood cell content of the blood is lower than normal because of too little iron and is the most common anaemia in South Asia.

TYPES OF ANAEMIA
- anaemia of B12 deficiency
- anaemia of chronic disease
- anaemia of folate deficiency
- drug-induced immune hemolytic anaemia
- hemolytic anaemia
- hemolytic anaemia due to g6pd deficiency
- idiopathic aplastic anaemia
- idiopathic autoimmune hemolytic anaemia
- immune hemolytic anaemia
- iron deficiency anaemia
- pernicious anaemia
- secondary aplastic anaemia
- sickle cell anaemia

Worldwide, approximately 20 percent of women, 50 percent of pregnant women, and 3 percent of men are iron deficient. Iron is an essential component of hemoglobin, the oxygen carrying pigment in the blood. Iron is normally obtained through the food in the diet and by the recycling of iron from old red blood cells.
The causes of iron deficiency are: too little iron in the diet, poor absorption of iron by the body, and loss of blood (including from heavy menstrual bleeding). It is also caused by lead poisoning in children. Nutritional Anaemia develops slowly after the normal stores of iron have been depleted in the body and in the bone marrow. Women, in general, have smaller stores of iron than men and have increased loss through menstruation, placing them at higher risk for nutritional anaemia. In men and postmenopausal women, anaemia is usually due to gastrointestinal blood loss associated with ulcers, the use of aspirin or nonsteroidal anti-inflammatory medications (NSAIDs), and parasite infestations. High-risk groups include: women of child-bearing age who have blood loss through menstruation; pregnant or lactating women who have an increased requirement for iron; infants, children, and adolescents in rapid growth phases; and people with a poor dietary intake of iron through a diet of little or no meat or eggs for several years. Risk factors related to blood loss are peptic ulcer disease, long term aspirin use, colon cancer, uterine cancer, and repeated blood donation.

Figure 1: Malnutrition and Life Cycle

Malnutrition is intergenerational. This means that the nutritional status of a mother has an effect on that of her children, and even her grandchildren. In order to improve nutrition, people at all stages of the life cycle (Figure 1) must be able to have better access to food, health and care. Women and girls are especially affected by malnutrition during the life cycle, and from one generation to the next, because of reproduction babies. As the primary care givers of the entire family, girls and women also need to be in good health and nutritional status to properly perform these roles. Therefore a good start in life for a new baby is dependent on the health and nutrition of his/her mother, and on her development and well being when she was a girl. Programmes to fight malnutrition must link the nutritional status of the infant, the adolescent, the mother, and the grandmother.
Preventing Nutritional Anaemia

Non-vegetarian dietary sources of iron are red meat, fish, liver, and egg yolks; vegetarian sources include breastmilk, lentils and beans, whole grains and products made from these foods. Sprouting grains and beans enhance the bioavailability of the iron they contain, as does consuming iron-rich foods with "enhancers" - foods that contain vitamin C. Iron inhibitors, such as tannin and caffeine, and some essential minerals, prevent iron from being absorbed and should be consumed separately from iron sources. In some parts of South Asia, flour, bread, and some cereals are fortified with iron. If the diet is deficient in iron, iron supplements should be taken orally. During periods of increased requirements such as pregnancy and lactation, dietary intake of iron should increase and women should take iron supplements. Iron supplements are generally combined with Folate or folic acid, since deficiencies in folate and iron can cause anaemia.

Much iron is lost through parasitic infestation. The best way to avoid getting intestinal parasites is to wash hands frequently, and always after using the toilet and before eating food, using soap and safe water. Dishes, eating utensils and pots and pans, as well as vegetables and fruits must be thoroughly washed, and cleaned, and if necessary treated with disinfectant, and stored in hygienic conditions. Keeping the environment clean and free from excreta (human and animal) is also important to prevent parasites. Living areas should be swept and washed regularly, and latrines used by all members of the family. Animals should be kept in separate, preferably fenced areas, to avoid contamination where children are likely to play, especially on or near the ground. Since malaria increases the risk of anaemia, bed nets should always be used where malarial mosquitoes are prevalent. In areas with high rates of parasitic infestation, deworming should be carried out on a regular basis (at least every six months; more frequently if necessary.) Depending on the type of worm (s) that is prevalent, albendazole (single dose) or mebendazole are the drugs of choice.
Symptoms and Signs of Anaemia

- pale skin, lips, tongue and inner surface of eyelids (conjunctiva)
- fatigue
- irritability
- weakness
- shortness of breath
- low blood pressure with position change from lying or sitting to standing (orthostatic hypotension)
- sore tongue
- brittle nails, concave nails
- unusual food cravings (called pica)
- decreased appetite (especially in children)
- headache - frontal
- low haematocrit and hemoglobin in a RBC
- low serum ferritin (serum iron) level

Note: There may be no symptoms if anaemia is mild.

Consequences of Nutritional Anaemia

- Impaired cognitive performance at all stages of life
- Significant reduction of physical work capacity and productivity
- Increased morbidity from infectious diseases
- Greater risk of death of pregnant women during the perinatal period
- Negative foetal outcome: intrauterine growth retardation, low birth weight, prematurity

Treatment

Identification of the cause of deficiency is essential. Iron deficiency, especially severe deficiency, is serious and even life-threatening. Usually, it cannot be overcome by increasing dietary intake alone. Iron supplements, along with improved diet and eating habits, healthier hygiene and sanitation practices, deworming, and other solutions are nearly always required. Oral iron supplements are in the form of ferrous
sulfate. The best absorption of iron is on an empty stomach, but many people are unable to tolerate this and may need to take the supplement with food. Milk and antacids containing calcium may interfere with absorption of iron and should not be taken at the same time as iron supplements. Taking vitamin C supplements or eating vitamin C-rich foods at the same time as iron supplements can increase absorption and is essential in the production of hemoglobin. Iron supplements are needed during pregnancy and lactation because normal dietary intake cannot supply the required amount for the mother and the growing foetus.

The haematocrit should return to normal after 2 months of daily iron supplementation, but the iron tablets should be continued for another 6 to 12 months to replenish the body’s iron stores, contained mostly in the bone marrow.

Intravenous or intramuscular iron is available for patients when iron taken orally is not tolerated. Severely anaemic persons may require blood transfusions, but even this solution is not without serious risk. After a prolonged period of iron deficiency, a sudden increase in blood iron can cause shock, and even death. In mild and moderate anaemia, there are usually no complications; however nutritional anaemia may recur, so regular follow-up is encouraged. Anaemic persons may have an increased susceptibility to infection.

The Prevalence of Nutritional Anaemia in South Asia

<table>
<thead>
<tr>
<th>Countries</th>
<th>% of women affected</th>
<th>% of pregnant women affected</th>
<th>% of children under 5 affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bangladesh¹</td>
<td>70.0</td>
<td>77.0</td>
<td>73.0</td>
</tr>
<tr>
<td>Bhutan²</td>
<td>-</td>
<td>59.0</td>
<td>-</td>
</tr>
<tr>
<td>India³</td>
<td>51.8</td>
<td>49.7</td>
<td>74.3</td>
</tr>
<tr>
<td>Maldives⁴</td>
<td>62.4</td>
<td>68.0</td>
<td>81.5</td>
</tr>
<tr>
<td>Nepal⁵</td>
<td>67.7</td>
<td>74.6</td>
<td>78.0</td>
</tr>
<tr>
<td>Pakistan⁶</td>
<td>-</td>
<td>29-33</td>
<td>62.9</td>
</tr>
<tr>
<td>Sri Lanka⁷</td>
<td>45.0</td>
<td>39.0</td>
<td>45.0</td>
</tr>
</tbody>
</table>
What are the Causes of Nutritional Anaemia in South Asian Women and Children?

<table>
<thead>
<tr>
<th>In Women:</th>
<th>In Children:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Insufficient quantity of iron-rich foods and “iron enhancers” in the</td>
<td>• Low iron stores at birth due to anaemia in mother</td>
</tr>
<tr>
<td>diet (foods rich in vitamin C such as citrus fruits), and low bioavailability of dietary iron (e.g. foods containing only non-heme iron)</td>
<td>• Early introduction of inappropriate, non-fortified substitutes of breast milk</td>
</tr>
<tr>
<td>• Excessive quantity of “iron inhibitors” in diet, especially during</td>
<td>• Non-exclusive breastfeeding and too early introduction of inappropriate complementary food (resulting in diminished breast milk intake, insufficient iron intake, and heightened risk of intestinal infections)</td>
</tr>
<tr>
<td>mealtimes (e.g. tea, coffee; calcium-rich foods)</td>
<td>• Late introduction of appropriate (iron-rich) complementary foods</td>
</tr>
<tr>
<td>• Iron loss during menstruation</td>
<td>• Insufficient quantity of iron and iron enhancers in diet, and low bioavailability of dietary iron (e.g. non-heme iron)³</td>
</tr>
<tr>
<td>• Poor iron stores from infancy and childhood deficiencies</td>
<td>• Increased iron requirements related to rapid growth and development during infancy and childhood, until adulthood; and, in some areas, heavy physical workloads</td>
</tr>
<tr>
<td>• Iron loss from post-partum haemorrhage</td>
<td>• Iron loss due to parasite load (e.g. malaria, intestinal worms)</td>
</tr>
<tr>
<td>• Increased iron requirement due to tissue, blood and energy requirements during pregnancy, and in some areas, due to heavy workloads</td>
<td>• Poor environmental sanitation, unsafe drinking water and inadequate personal hygiene</td>
</tr>
<tr>
<td>• Teenage pregnancy</td>
<td></td>
</tr>
<tr>
<td>• Repeated pregnancies with less than 2 years’ interval</td>
<td></td>
</tr>
<tr>
<td>• Iron loss due to parasite load (e.g. malaria, intestinal worms)</td>
<td></td>
</tr>
<tr>
<td>• Poor environmental sanitation, unsafe drinking water and inadequate personal hygiene</td>
<td></td>
</tr>
</tbody>
</table>

Why is Nutritional Anaemia a Priority?

More than 350 million women and up to twice as many infants, children and adolescents, around the world suffer from nutritional anaemia. Ninety percent of these individuals live in developing countries, and among these, the highest prevalence of anaemia is found in South Asia. Recent anaemia studies in several states of India, Bangladesh and Nepal indicate that up to 90 percent of infants and young children and 75 percent of pregnant women may be suffering from nutritional anaemia.
Nutritional Anaemia Prevention and Control on the Global Agenda

- **The World Summit for Children - New York, September 1990:** 71 Heads of State and Government and 88 other senior officials pledged to reduce the rate of iron deficiency anaemia in pregnant women by one third of the 1990 levels by 2000.

- **International Nutritional Anaemia Consultative Group (INACG):** Chief purpose is to guide activities aimed at reducing nutritional anaemia in the world. Specific objectives include:
  - assessing the regional distribution and size of nutritional anaemia.
  - developing intervention strategies and methodologies to combat deficiency anaemia.
  - evaluating the effectiveness of implemented programmes on a continuing basis.
  - performing research needed to support the assessment, intervention, and evaluation of programmes.

INACG held its second international meeting on "Why Iron is Important and What to Do about it: A New Perspective" in Hanoi, Vietnam (15-16 February 2001), providing participants from many countries an opportunity to share expertise.

- **Project Iron Deficiency Elimination Action (IDEA) of International Life Sciences Institute (ILSI) Micronutrient Deficiencies Program:** develops and implements country-specific fortification strategies to reduce the incidence of iron deficiency anaemia. Project IDEA has ongoing activities in China, Mexico, India, Indonesia, Vietnam, Egypt and Zambia. Project IDEA's meeting, "Forging Effective Strategies to Combat Iron Deficiency" was held on 7-9 May 2001, in Atlanta, Georgia, USA.

- **The Global Alliance for Improved Nutrition (GAIN):** a new alliance of public and private sector partners was launched during The Special Session on Children (SSC) meeting seeking to save lives and improve health by eliminating vitamin and mineral deficiencies. SSC, a follow-up to the 1990 World Summit for Children, was held on 8-10 May 2002 at the United Nations in New York.
What is UNICEF doing Globally?


- UNICEF/WHO Regional Consultation on Prevention and Control of Iron Deficiency Anaemia in Women and Children (UNICEF Regional Office for Central and Eastern Europe, the Commonwealth of Independent States and the Baltic States and WHO Regional Office for Europe), Geneva, Switzerland, 3-5 February 1999. Outcome: Recommendations for actions for complementary feeding, education for dietary change, flour fortification, iron supplementation, integrated programmes to cover all high-risk groups, linkages to other ongoing programmes and monitoring and evaluation of programmes and documentation.

What is UNICEF Doing in South Asia to prevent and Control Nutritional Anaemia?

UNICEF-Regional Office for South Asia (UNICEF-ROSA)

In 2000, UNICEF-ROSA initiated the South Asia Nutrition Group for/ on Anaemia-related Micronutrients (SANGAM). A sub-group of SANGAM, South Asian Thinkers/Think Tank On Preventing Anaemia (STOP Anaemia) has been established in Nepal to develop and conduct operational research on practical methods to prevent and control nutritional anaemia. The objectives of the groups are to:

- create a group of thinkers in each South Asian country dedicated to identifying long and medium term strategies and solutions to nutritional anaemia, especially in women in South Asia.

- determine gaps and inadequacies in current strategies, policies, guidelines and actions which hinder the prevention and control of nutritional anaemia in all women throughout the life cycle in South Asia.
• identify the constraints to achieving prevention and control of nutritional anaemia, including behavioural change, involving related sectors (sanitation and hygiene) and including therapy for deworming.

So far, two field visits and 10 STOP Anaemia meetings have been held in Nepal. In 2001, the group will prepare, together with UNICEF-India, a consultation on anaemia and adolescents. The group is carrying out operational research on anaemia control and reduction, using a life-cycle approach, and including youth and older adults, in addition to young children, pregnant and lactating women.
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- Reported on UNICEF-ROSA, UNICEF-South Asia and partners' nutritional anaemia activities at ACC/Sub-Committee on Nutrition meeting in Nairobi, April 6, 2001.
- Strengthen and expand SANGAM and STOP Anaemia groups, and initiate electronic networking on anaemia control, prevention and treatment.
- Initiate operational research in Nepal and India on a holistic approach to reducing anaemia, creating awareness of nutritional anaemia, and bringing about behaviour changes in nutrition.
- Documented links between adolescent and women's nutrition, nutritional anaemia, low birth weight (LBW), safe motherhood and maternal mortality reduction and basic education.
- Develop and coordinate South Asia Behaviour Change Intervention (SA BCI) programmes for adolescents' and women's nutrition, nutritional anaemia and LBW for implementation in 2002-2004.

UNICEF- South Asia Country Offices

Bhutan

- **1997-2001:**
  - Current activities: Daily iron/folate supplementation is provided to pregnant women from the first antenatal visit to two months after delivery, and six-monthly deworming with a single dose of albendazole is provided to all under-five children, and school children. Kitchen gardens for improving the availability of iron- and other micronutrient-rich foods are promoted in communities, and a community-based nutrition programme has been initiated to address all forms of nutritional deficiencies at the community level.

- **2002-2006:**
  - UNICEF and Royal Government of Bhutan conducted an assessment of the anaemia situation in 2001, the community-based nutrition intervention programme will be expanded nation-wide in a phased manner; weekly iron supplementation to all adolescent girls in partnership with the school health programme will be initiated; sentinel surveillance for anaemia and other nutritional deficiencies will be introduced.
India
• Adolescent anaemia projects are operational in 11 states, based on a once-per-week supervised iron/folate supplement for school girls. Programmes are implemented through schools, with strategies for community outreach. The initial plan was for outreach from school girls to out-of-school girls. Other strategies are being tested in Orissa, Tamil Nadu and Rajasthan.

Maldives
• Promotion of personal hygiene and environmental sanitation; mass deworming for school children; iron supplementation for pregnant mothers and micro planning through the Comprehensive Nutrition Programme (CNP).

Nepal
• At national level with His Majesty’s Government of Nepal, ensure the availability of iron/folate supplements for MoH and monitoring the availability of supplements throughout the country in collaboration with John Snow International; development of radio and TV spots for broadcast throughout the country in order to increase general awareness about anaemia and to promote the use of iron supplements during pregnancy; developing a health facility treatment protocol for iron supplementation and promoting decentralisation of iron distribution outside of the health facilities utilising the existing extensive network of community-based female community health volunteers.
• At community level: provides advocacy for iron supplementation during pregnancy where the Decentralised Planning for the Child Programme is implemented; encourages women to attend antenatal clinics; monitors the acceptability of supplements; establishes links to outreach activities.

Pakistan
• A project agreement was signed between the Government and UNICEF in 1998 to initiate iron fortification of wheat flour to prevent or reduce iron deficiency anaemia. An updated situation analysis of wheat flour in
relation to production, distribution, commercialisation, consumption and potential for iron fortification was carried out. UNICEF and partners organised a consultative meeting with representatives from the Pakistan Flour Mills Association to motivate and build support for iron fortification, and developed a detailed proposal for testing the potential of fortifying wheat flour.

Sri Lanka

• Technical support is provided to national, provincial and community level staff to plan, deliver and monitor responsive services based on assessment of the national and local situation.
• Supplements are provided where necessary particularly to the Participatory Nutrition Improvement Project.
• Provides support and recommendations to community and government for inputs into water supply and human waste disposal facilities in deprived and difficult areas.
References

Boys and girls, men and women are all at risk of anaemia. Causes of anaemia are related to inadequate dietary intake of iron, poor iron stores, iron loss due to parasite load, poor environmental sanitation, unsafe drinking water and inadequate personal hygiene, and excessive physical workloads. Anaemia has terrible effects on health and well-being - some are irreversible - including mental retardation and poor school performance; tiredness, and poor ability to do labour, sports, and other physical activities; reduced capacity, increased illness, greater risk of death of women during maternity and birth; low birth weight and premature births…

LET’S STOP ANAEMIA NOW!