Nutritional Anaemia in Adolescent Girls in India - An Insight

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Abstract
Adolescent population constitute near about one fifth of the total Indian population. Indian adolescent girls constitute a vulnerable group where they are deprived of nutrition and better health facility either due to poverty or due to social discrimination or other socio-cultural reasons. They are deprived of good food and education and often end up with early marriages. The added menstrual loss due to menarche and also due to early pregnancy worsens the gravity of anaemia in this population. The world wide attention is now focusing on the nutritional targets for the adolescent girls so that they too enjoy the right to live nutritionally fulfilled and physically healthy.

Introduction
Anaemia, the most common blood disorder, affecting about a third of the global population, is defined as a decrease in the total amount of red blood cells (RBCs) or haemoglobin in the blood, or a lowered ability of the blood to carry oxygen. The name is derived from Ancient Greek word: ‘anaemia’, meaning “lack of blood”.

World Health Organization (WHO) has defined anaemia as a condition in which the number of RBCs or their oxygen-carrying capacity is insufficient to meet physiologic needs, which vary by age, sex, altitude, smoking, and pregnancy status. Iron deficiency is thought to be the most common cause of anaemia globally, although other conditions, such as folate, vitamin B12 and vitamin A deficiencies, chronic inflammation, parasitic infections, and inherited disorders can all cause anaemia.

The anaemia can also be classified by severity into mild (110 g/L to normal), moderate (80 g/L to 110 g/L), and severe anaemia (less than 80 g/L) in adult males and adult non-pregnant females [1].

According to WHO, diagnosis of anaemia in different age group, is based on the following parameter as depicted in Table 1 [2].

Anemia can be classified on the basis of aetiology or RBC morphology. Aetiologically, anaemia can be of three types: (i) Haemorrhagic or blood loss anaemia, (ii) Haemolytic anaemia, and (iii) Anaemia due to reduced erythropoiesis. Morphologically, anaemia is classified based on the size of red blood cells and amount of haemoglobin in each RBC. This is clinically important and could be - microcytic anaemia (if the cells are small), macrocytic anaemia (if the cells are large), and normocytic anaemia (if the cells are normal in size). Based on the

<table>
<thead>
<tr>
<th>Age or Gender Group</th>
<th>Hb Threshold (g/dl)</th>
<th>Hb Threshold (mmol/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children (0.5 – 5.0 yrs.)</td>
<td>11.0</td>
<td>6.8</td>
</tr>
<tr>
<td>Children (5–12 yrs)</td>
<td>11.5</td>
<td>7.1</td>
</tr>
<tr>
<td>Teens (12–15 yrs)</td>
<td>12.0</td>
<td>7.4</td>
</tr>
<tr>
<td>Women, non-pregnant (&gt;15yrs)</td>
<td>12.0</td>
<td>7.4</td>
</tr>
<tr>
<td>Women, pregnant</td>
<td>11.0</td>
<td>6.8</td>
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<tr>
<td>Men (&gt;15yrs)</td>
<td>13.0</td>
<td>8.1</td>
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</tbody>
</table>

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quantity of haemoglobin in each RBC, anaemia could be normochromic (if the quantity is normal); or hypochromic (if the quantity is less).

Adolescence has been defined by the WHO as the period of life spanning the ages between 10 to 19 years. This is the formative period of life when the maximum amount of physical, psychological, and behavioural changes take place. This is a vulnerable period in the human life cycle for the development of nutritional anaemia, which needs constant attention under the public health programmes. Girls are more likely to be a victim due to various reasons. In studies conducted in developing countries, adolescent anaemia was reported as the greatest nutritional problem [3].

Anaemia in adolescent girls is mostly due to deficiency of various factors most importantly iron deficiency. Iron deficiency anaemia is the most common type of anaemia overall and it has many causes. RBCs often appear hypochromic (paler than usual) and microcytic (smaller than usual) when viewed with a microscope.

Iron is an essential part of haemoglobin, and low iron levels result in decreased incorporation of haemoglobin into RBCs. Iron deficiency anaemia is due to insufficient dietary intake or absorption of iron to meet the body's needs. Infants, toddlers, and pregnant women have higher than average needs. Increased iron intake is also needed to offset blood losses due to digestive tract issues, frequent blood donations, or heavy menstrual periods. Studies have shown iron deficiency without anaemia causes poor school performance and lower IQ in teenage girls, although this may be due to socio-economic factors.

In a body, that is already deficient in the necessary iron that it requires, the added burden of menstrual loss further worsens the situation. Normal monthly menstrual blood loss that occurs for a limited number of days and for a particular quantity, the loss is still compensated. But in the rural areas, where most women are not aware of where the distinction between normal and pathological is and where proper healthcare facilities are not available, where proper attention is not paid to such problems, abnormal and excessive menstrual bleeding still goes unsurfaced and it keeps affecting the young adolescent girls.

**Epidemiology**

Anaemia is widespread across all continents varying mostly on the aetiology. The socio-economic condition of the population is an important indicator for determining the incidence rate of this condition. Nutritional iron deficiency is common in developing nations. An estimated two-thirds of children and of women of childbearing age in most developing nations are estimated to suffer from iron deficiency; one-third of them have the more severe form of the disorder, anaemia. Worldwide, the most common cause of iron deficiency anaemia is parasitic infestation (hookworms, amoebiasis, schistosomiasis).

WHO in its report The Global Prevalence of Anaemia in 2011 (published in 2015) has described prevalence of anaemia for the year 2011 in pre-school age (16-59 months) and women of reproductive age (15-49 years), by pregnancy status and by regions of the UN, WHO and country. It is estimated that roughly 43% of children, 38% of pregnant women, and 29% of nonpregnant women and 29% of all women of reproductive age have anaemia globally, corresponding to 273 million children, 496 million non-pregnant women and 32 million pregnant women. Global nutrition target 2015 is 50% reduction of anaemia in women of reproductive age as envisaged in Comprehensive Implementation Plan on maternal, infant and young child nutrition by WHO. Iron Deficiency Anaemia is one of the most widespread nutritional deficiency disorder in the Indian subcontinent, which affects around 58 per cent of the pregnant women, 50 per cent of the women in the reproductive age, 56 per cent of the adolescent girls and 70 per cent of the children under five years of age [2].

As per the India Census -2011 data, there are 253 million adolescents in the age group 10-19 years, which comprise little more than one-fifth of India’s total population. This age group comprises of individuals in a transient phase of life requiring nutrition, education, counselling and guidance to ensure their development into healthy adults [4].

In India, 22% babies born each year have low body weight, which has been linked to maternal under-nutrition and anaemia among other causes. Half of adolescents (boys and girls) have below normal body mass index (BMI) and almost 56% of adolescent girls aged 15–19 years have anaemia [4].

**Potential Risk for Adolescent**

**a. Accelerated requirement:** Due to rapid transition from childhood towards adulthood, the adolescent group have a sharp increase in requirement for various nutrients in order to meet the demand for the increase in body mass, blood volume and muscle mass. Additional iron is required to
compensate for the expanding red cell mass due to growth as well as for the menstrual flow.

b. Faulty food habits: The increasing tendency of to consume junk food and carbonated drinks and less preference for fresh fruits, vegetables and meat is one of the major culprit for low dietary intake and reduced bio-availability of iron. Intakes of refined cereals, which contain high amount of phytates, further lower the bio-availability of dietary iron. As in India, 50% of adolescent girls ingest less than 50% Recommended Dietary Allowances (RDA) for energy and more than 70% of them hardly consume 50% of RDA of iron [1, 5].

c. Social discrepancy: Social discrimination towards girl child and favouritism for boys, play a much crucial role in further decline in quality and quantity of nutritional diet of adolescent girls.

d. Parasitic infestations and infectious diseases: The frequency of worm infestations ranges from 31% to 71% in India. Anaemia prevalence was doubled in girls with such infestations as compared to non-infested groups. Lack of education for sanitation and hygiene highly attribute to the standard of living and thus the frequency of worm infestations [6, 7]

e. Early marriage and adolescent pregnancy: Early marriages are still very common in Indian scenario, particularly in few tribal populations. Marriage before attaining 18 years of age in girls is 47.4% and India ranks 6th among top 10 countries with high rates of child marriage among women [8]. Early marriage often followed by early pregnancy, worsening the iron deficiency anaemia.

f. Lack of education and awareness: Low educational status in adolescent girls either due to social discrimination or due to poverty plays a pivotal role in understanding the importance of nutrition and health. Lack of education also lead to not only lack of awareness and but also inability to understand the importance of nutritional programs [9].

Prevention

In view of the scientific and socio-economic factors governing anaemia, it is recommended that an integrated approach based on identifying and addressing the contributing factors is taken at country level which should always take into account the local factors. These efforts should be built into the primary health care system of the target population. WHO has recognized anaemia as an important component of the health of women and children globally and has targeted a 50% reduction in women of reproductive age by the year 2025.

Government of India Initiatives

Recognizing the importance of intervention at the proper age to prevent anaemia in adolescent girls and the consequential health issues, the Government of India has initiated a multi-pronged action plan.

National Nutritional Anemia Control Program (NNACP) implemented through the Primary Health Centers and its subcenters, aims at decreasing the prevalence and incidence of anemia in women of reproductive age. It focuses on three vital strategies: promotion of regular consumption of foods rich in iron, provisions of iron and folate supplements in the form of tablets to the high risk groups, and identification and treatment of severely anemic cases. The program solicits the support of various departments in implementing the dietary modification and supplementation measures [10].

The major steps to prevent and treat anaemia amongst women include launching of “National Iron Plus Initiative” under RMNCH+A (Reproductive, Maternal, Newborn, Child and Adolescent) Programme by the Ministry of Health and Family Welfare in 2013 as a comprehensive strategy (on the principle of ‘continuum of care’) to combat the public health challenge of Iron Deficiency Anaemia. There are age specific interventions with Iron and Folic Acid Supplementation (100 mg elemental iron and 500 mcg folic acid) and Bi-annual Deworming (Albendazole 400 mg) for improving the haemoglobin levels and reducing the prevalence of anaemia in adolescent girls (10-19 years), both in and out of school. Those in school are reached through Weekly Iron and Folic Acid Supplementation (WIFS), while ‘out of school’ adolescents are reached through Angan Wadi Centres (AWCs). The iron and folic acid (IFA) tablet for adolescents is coloured blue (‘Iron ki nili goli’) to distinguish it from the red IFA tablet for pregnant and lactating women. Under this programme, target group population is screened for moderate and severe anaemia and referral to an appropriate health facility; and counselling for improving dietary intake and preventive actions for intestinal worm infestation.
The target for RMNCH+A for 2017 has been set as to reduce anaemia in adolescent girls (15–19 years) at annual rate of 6% from the baseline of 56% [11].

The new adolescent health strategy envisages generation of awareness, and communication on consumption of balanced diet, nutritious food and inter-generational effects of malnutrition. Accordingly, it has been proposed to hold nutrition education sessions at the community level using existing platforms like Village Health Nutrition Day, Kishori Diwas, school setting, AWCs and Nehru Yuva Kendra Sangathan. Nutritional counselling on a dedicated quarterly Adolescent Health Day (to coincide with Kishori Diwas) has also been proposed. To make deeper inroads, nutrition education shall be included in school curriculum, establishing working linkages with ‘Sakshar Bharat’ Abhiyan. Under the child health screening and early intervention services, screening of adolescents for low Body Mass Index has been proposed and this will be followed by counselling at adolescent health clinics [12].

Recently, NITI Aayog has come out with a national strategy to fight maternal and child malnutrition and anaemia among women and girls. Recognizing that India pays an income penalty of 9-10% due to workforce stunted during childhood, the National Nutrition Strategy aims to bring nutrition to the centerstage of the National Development Agenda and has outlined a vision of Kuposhan Mukt Bharat (Malnutrition Free India), reducing all forms of malnutrition by 2030. It also aims to reduce prevalence of anaemia in women and girls from 53.1% to 17.7% in five years.

Failures of National Nutritional Programmes [13]

1. Lack of nodal government body that can co-ordinate and monitor the multi-sectoral programmes in order to achieve the nutrition targets in a defined region.

2. Inability to recognize the children with stunted growth and early stage of under-nutrition by anthropometric measurements. Early diagnosis is critical for initiating early supplementation.

3. Financial constrain is one of the crucial factor for not achieving the nutritional target. Adequate financial resource would aid in streamlining the operations by providing better education, training for improving programme targeting and standardization of supplementary food.

4. Lack of adequate manpower.

5. Limited availability of fortified food.

6. Inadequate policies to collaborate agriculture with nutrition like production og nutrient rich crops and oils.

References


11. RMNCH+A (2014) India’s reproductive, maternal, newborn, child and adolescent health strategy.

