Guidelines for Control of Iron Deficiency Anaemia

National Iron+ Initiative

Towards infinite potential in an anaemia free India

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Adolescent Division
Ministry of Health and Family Welfare
Government of India

Acknowledgements

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Additional Secretary & Mission Director, NRHM Ms. Anuradha Gupta's encouragement was our inspiration and her strategic vision shaped the guidelines.

Joint Secretary, RCH, Dr. Rakesh Kumar provided valuable insights and facilitated technical discussions which were critical for finalizing the guidelines.

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गुलाम नबी आज़ाद
GHULAM NABI AZAD

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Message

Anaemia is a significant public health challenge in India. It has devastating effects on health, physical and mental productivity affecting quality of life, particularly among the vulnerable. Urgent action from all concerned is called for since Anaemia could translate into significant morbidities for affected individuals and consequent socio-economic losses for the country.

Prevention and control of anaemia is one of the key strategies of the Health, Nutrition and Population Sector Programmes for reducing maternal, neonatal and childhood mortality and improving maternal, adolescent and childhood health status.

I am confident that if the comprehensive sets of actions identified in National Guidelines for Control of Iron Deficiency Anaemia are fully implemented; children, adolescents and women in India will have improved health outcomes and be able to achieve their fullest potential. Implementation of this initiative in the right earnest would move us closer to reaching the Millennium Development Goals with regard to bringing down maternal and child mortality.

The challenge before us now is to ensure the implementation of this initiative in its entirety and to further build upon it. Prevention and control of anaemia requires a coordinated response among multiple stakeholders and partners, and I request all to come forward to support interventions in line with the National Guidelines.

(Ghulam Nabi Azad)

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Message

India is among the countries with high prevalence of anaemia. It is widely prevalent in all age groups, being particularly high among the most vulnerable; nearly 58 per cent in pregnant women, 50 per cent among non-pregnant non-lactating women, 56 per cent among adolescent girls, 30 per cent in adolescent boys and around 80 per cent in children under two years of age.

Anaemia, thus poses a major threat to maternal and child survival, contributes to low birth weight, lowered resistance to infection, poor cognitive development and decreased work productivity. The magnitude of anaemia together with the associated adverse health, development and economic consequences, highlights the need for intensified action to address this public health problem.

Success in prevention and control of anaemia will contribute to reduction of maternal and child mortality and improve health outcomes for population as a whole. In this context, “National Guidelines for Control of Iron Deficiency Anaemia” has been developed to identify strategies and comprehensive actions needed across the life cycle to eliminate this serious obstacle to survival, health and development.

The guidelines have been designed to be handy and user friendly for service providers across levels and will be a useful tool in planning and implementing this initiative. I urge States and key stakeholders to prioritize implementation of Iron+ Initiative which will have long term impact on the health status of India’s population.

15.1.13

(P.K. Pradhan)

Place: New Delhi
15th January, 2013

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Preface

Anaemia is a major public health challenge in India. Yet, a comprehensive plan of action to combat this problem has been missing. There are certain existing guidelines for control of Iron Deficiency Anaemia with regard to children and pregnant women and lactating mothers. However, many critical age groups have been missing from this strategy. For instance, adolescents have received no attention so far. There have also been crevices by way of actual administration of IFA to children with several operational issues constraining the prescribed interventions.

The National Iron+ Initiative is an attempt to look at Iron Deficiency Anaemia comprehensively across all life stages including adolescents and women in reproductive age group who are not pregnant or lactating. The schedule of IFA supplementation has also been reviewed to make both administration and compliance much simpler. For children, 6 months to 5 years, there is now a bi-weekly schedule of IFA supplementation with ASHA being responsible for administering the prescribed dosage under her direct supervision. For children of class I to class V in Government/Government aided schools, there is a much simpler weekly schedule of IFA supplementation, under the supervision of teachers. Similarly, adolescents from class VI to class XII receive weekly IFA supplementation in school itself. For women in reproductive age group who are neither pregnant nor lactating, ASHA shoulders the responsibility of providing IFA supplementation.

Clearly, the National Iron+ Initiative builds on the gains of the NRHM, more particularly the strong work force of 8,80,000 ASHAs who have shown excellent potential to mobilise community for a large scale uptake of health services. The fact that ASHAs are now undertaking home visits under the recently rolled out HBNC programme and are also doing home delivery of contraceptives to couples in the reproductive age group opens up several exciting opportunities for ASHAs to render additional services such as IFA supplementation. This initiative makes use of this wonderful opportunity in its bid to reach to all age groups seamlessly.

National Guidelines for Control of Iron Deficiency Anaemia has four purposes:

1. To bring to attention of program managers of health and health related activities the serious negative consequences of anaemia for the health and physical, mental, and economic productivity of individuals and populations

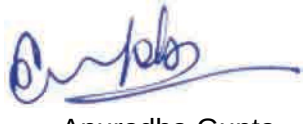
2. To layout IFA supplementation protocols across the life cycle (preventive strategy)

3. To define a minimum standard treatment protocol for facility based management of mild, moderate and severe anaemia segregated by levels of care (curative strategy)

4. To broadly identify platforms of service delivery and indicate roles of service providers

These guidelines have been developed taking cognizance of scientific evidence as well as considerable consultation with domain experts. It builds on past and continuing work on anaemia prevention and control in India and has been developed in the context of existing policies and strategies of the health, nutrition and population sector. It identifies comprehensive strategies and interventions for high risk groups, in particular infants and young children, adolescent girls, women in reproductive age, and pregnant and breastfeeding women, and for the population as a whole.

I am certain that the states on their part will do the utmost to ensure that appropriate linkages and mechanisms for training, monitoring and operationalizing this initiative are put in place at the earliest and implementation taken up in real earnest so that together we can build a healthy, anaemia free India.



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Dated: 15th January, 2013

Foreword

Anaemia, a manifestation of under-nutrition and poor dietary intake of iron is a serious public health problem among pregnant women, infants, young children and adolescents. Data suggests that 7 out of every 10 children aged 6-59 months in India are anaemic. Three per cent of children aged 6-59 months are severely anaemic, 40 per cent are moderately anaemic, and 26 per cent are mildly anaemic. In fact the percentage of children with any anaemia increased from 74.3 per cent in NFHS-II to 78.9 per cent in NFHS-III.

India is among the countries with high prevalence of anaemia in the world. It is estimated that anaemia directly causes 20 per cent of maternal deaths in India and indirectly accounts for another 20 per cent of maternal deaths.

Taking cognizance of this, the Ministry of Health and Family Welfare has developed the National Guideline for Control of Iron Deficiency Anaemia to holistically address both preventive and curative aspect of this challenge across all life stage and various levels of care.

The document provides a guide for all stakeholders and partners on how policy makers, health professionals, community members and families can take action to prevent and control anaemia. I call upon all stakeholders and partners for their continued support in this respect.

I sincerely hope that States will proactively work on this initiative which will have a long term impact on the health of India.

(Dr. Rakesh Kumar)

Contents

Acronyms

AG	Adolescent Girl
ANC	Antenatal Care
ANM	Auxiliary Nurse Midwife
ASHA	Accredited Social Health Activist
AWC	Anganwadi Centre
CHC	Community Health Centre
CNS	Central Nervous System
DALY	Disability Adjusted Life Years
DH	District Hospital
F-IMNCI	Facility-based Integrated Management of Neonatal and Childhood Illness
FRU	First Referral Unit
GDP	Gross Domestic Product
Hb	Haemoglobin
ICDS	Integrated Child Development Services
IDA	Iron Deficiency Anaemia
IFA	Iron and Folic Acid
IMNCI	Integrated Management of Neonatal and Childhood Illness
ITBN	Insecticide Treated Bed Nets
KSY	Kishori Shakti Yojana
LBW	Low Birth Weight
LHV	Lady Health Visitor
LLIN	Long Lasting Insecticide Nets
MCP Card	Mother Child Protection Card
MO	Medical Officer
MoHFW	Ministry of Health and Family Welfare
MUAC	Mid Upper Arm Circumference
MWCD	Ministry of Women and Child Development
NFHS	National Family Health Survey
NNMBS	National Nutrition Monitoring Bureau Survey
NPAG	Nutrition Programme for Adolescent Girls
PHC	Primary Health Centre
PNC	Postnatal care
PW	Pregnant Woman
RBC	Red Blood Cells
VHND	Village Health and Nutrition Day
WIFS	Weekly Iron and Folic Acid Supplementation
WRA	Women of Reproductive Age

1

Anaemia – A Public Health Challenge

1.1. What is Anaemia?

Anaemia is a condition in which the number of red blood cells (RBCs), and consequently their oxygen-carrying capacity, is insufficient to meet the body's physiological needs. **The function of the RBCs is to deliver oxygen from the lungs to the tissues and carbon dioxide from the tissues to the lungs. This is accomplished by using haemoglobin (Hb), a tetramer protein composed of haem and globin. Anaemia impairs the body's ability for gas exchange by decreasing the number of RBCs transporting oxygen and carbon dioxide.** Anaemia results from one or more of the following process: defective red cell production, increased red cell destruction or blood loss. Iron is necessary for synthesis of haemoglobin. Iron deficiency is thought to be the most common cause of anaemia globally, but other nutritional deficiencies (including folate, vitamin B12 and vitamin A), acute and chronic inflammation, parasitic infections, and inherited or acquired disorders that affect Hb synthesis, red blood cell production or red blood cell survival can all cause anaemia. Iron deficiency anaemia results in impaired cognitive and motor development in children and decreased work capacity in adults (Figure 1.1). The effects are most severe in infancy and early childhood. In pregnancy iron deficiency anaemia can lead to perinatal loss, prematurity and low birth weight (LBW) babies. Iron deficiency anaemia also adversely affects the body's immune response.

Fig. 1.1: Adverse effects of anaemia

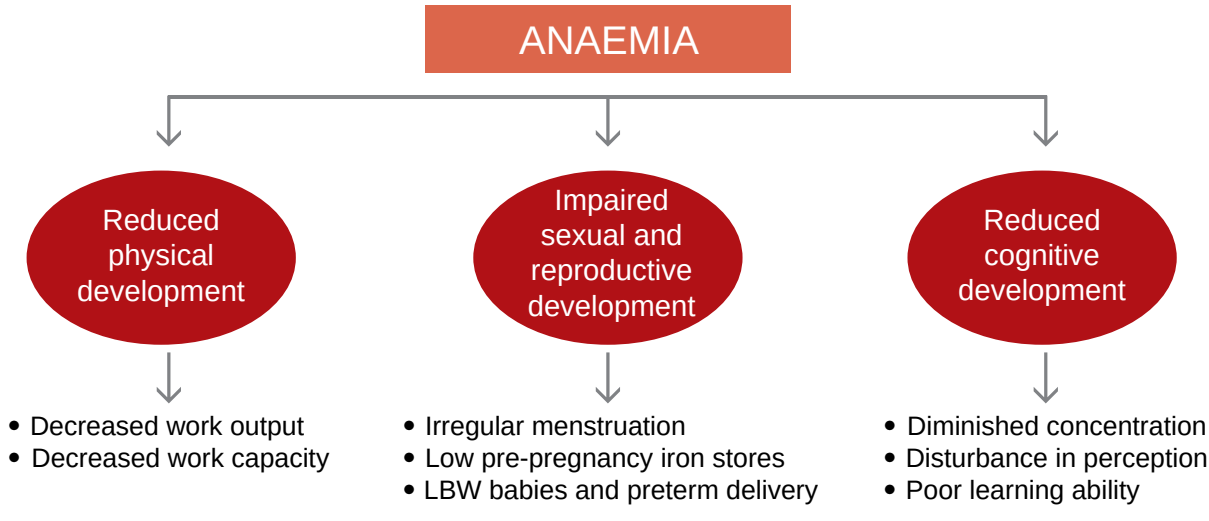


Table 1.1: Haemoglobin levels to diagnose anaemia (g/dl)

Age groups	No Anaemia	Mild	Moderate	Severe
Children 6–59 months of age	≥11	10–10.9	7–9.9	<7
Children 5–11 years of age	≥11.5	11–11.4	8–10.9	<8
Children 12–14 years of age	≥12	11–11.9	8–10.9	<8
Non-pregnant women (15 years of age and above)	≥12	11–11.9	8–10.9	<8
Pregnant women	≥11	10–10.9	7–9.9	<7
Men	≥13	11–12.9	8–10.9	<8

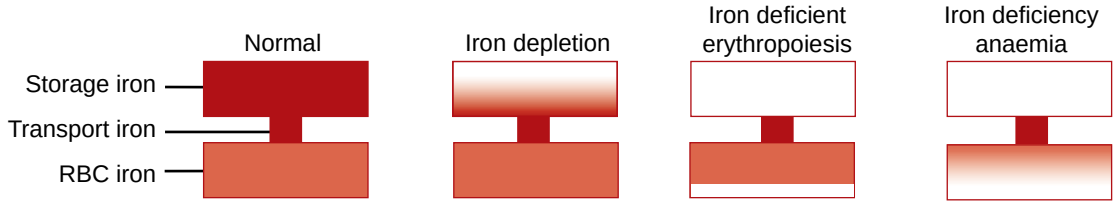
Source: Haemoglobin concentration for the diagnosis of anaemia and assessment of severity. WHO

1.2. Aetiology of Anaemia

The commonest causes of anaemia in developing countries, particularly among the most vulnerable groups (pregnant women and preschool age children), are nutritional disorders and infections. Hence the causes of anaemia could be segregated as nutritional and non-nutritional, underscoring the aetiological importance of dietary deficiency as the major causative factor.

1.2.1 Iron deficiency

Iron status can be considered as a continuum from iron deficiency with anaemia, to iron deficiency with no anaemia, to normal iron status with varying amounts of stored iron, and finally to iron overload which can cause organ damage when severe. Iron deficiency is the result of long-term negative iron balance. Iron deficiency anaemia (IDA) should be regarded as a subset of iron deficiency, that is, it represents the extreme lower end of the distribution of iron deficiency.



Iron deficiency adversely affects

- The cognitive performance, behaviour and physical growth of infants, preschool and school-age children;
- The immune status and morbidity from infections of all age groups;
- The use of energy sources by muscles and thus the physical capacity and work performance of adolescents and adults of all age groups.

Iron requirements are highest for pregnant women –1.9 mg/1,000 Kcal of dietary energy in the second trimester and 2.7 mg/1,000 Kcal in the third trimester. These are followed by iron requirements in infants (1.0 mg), adolescent girls (0.8 mg), adolescent boys (0.6 mg), non-pregnant women (0.6 mg), preschool and school age children (0.4 mg), and adult men (0.3 mg).

Iron deficiency is a consequence of:

- Decreased iron intake
- Increased iron loss from the body
- Increased iron requirement

Iron requirements increase during the period of active growth in childhood, especially from 6 months to 3 years. In infancy, iron deficiency is most often the result of lack of exclusive breast feeding and use of unsupplemented milk diets which contain inadequate amounts of iron. Milk products are very poor sources of iron and prolonged breast or bottle feeding of the infant without complementary feeds after 6 months of age frequently lead to iron deficiency unless there is iron supplementation. Iron requirements are proportionately greater in premature and underweight babies. In older children, a predominantly milk and cereal based diet and food fads can also lead to IDA.

Blood loss during menstruation and increased iron requirements during pregnancy and lactation predispose women to poor iron stores. Traditionally, the Indian housewife eats last, after all male members and children have eaten and in many families, the women eat only the leftovers. Hence, even though the food prepared for the family is the same, women are more prone to develop IDA than other members of the family.

1.2.2 Other micronutrient deficiencies

Vitamin B12 is necessary for the synthesis of RBCs and its deficiency has been associated with megaloblastic anaemia. Diets with little or no animal protein, as is often the case in our country, coupled with malabsorption related to parasitic infections of the small intestine, might result in Vitamin B12 deficiency and anaemia.

Folic acid is also essential for the formation and maturation of RBCs and is necessary for cell growth and repair. Deficiency of folate reduces the rate of DNA synthesis with consequent impaired cell proliferation and intramedullary death of resulting abnormal cells; this shortens the lifespan of circulating RBCs and results in anaemia.

1.2.3 Helminthic infestation

Helminths such as hookworm and flukes cause chronic blood loss and consequently iron loss from the body, resulting in the development of anaemia. A hookworm burden of 40–160 worms (depending on the iron status of the host) is associated with IDA.

1.2.4 Malaria

Malaria, especially by the protozoa *Plasmodium falciparum* and *vivax*, causes anaemia by rupturing RBCs and suppressing production of RBCs. Decreased RBC production results from marrow hypoplasia seen in acute infection. *Plasmodium falciparum* is the primary cause of severe malaria in regions where malaria is endemic. Malarial anaemia can cause severe morbidity and mortality especially in children and pregnant women infected with *Plasmodium falciparum*. Malaria in pregnancy increases the risk of maternal anaemia, stillbirth, spontaneous abortion, LBW and neonatal deaths.

1.2.5 Sickle cell disease and thalassemia

Sickle cell disease is an inherited disorder of haemoglobin. It is among the most common genetic diseases in the world and results in recurrent haemolytic anaemia. Thalassemia is one of the major haemoglobinopathies among the population all over the world. It is caused due to decreased or negligible amount of globin chain of haemoglobin. About 10 per cent of the world's thalassemia patients belong to the Indian subcontinent and 3.4 per cent of them are carriers. In India, about 32,400 infants are born with haemoglobinopathies every year[1].

1.2.6 Infections

Certain chronic diseases, such as cancer, HIV/AIDS, rheumatoid arthritis, Crohn's disease and other chronic inflammatory diseases, can interfere with the production of RBCs, resulting in chronic anaemia. Kidney failure can also cause anaemia.

2

Background

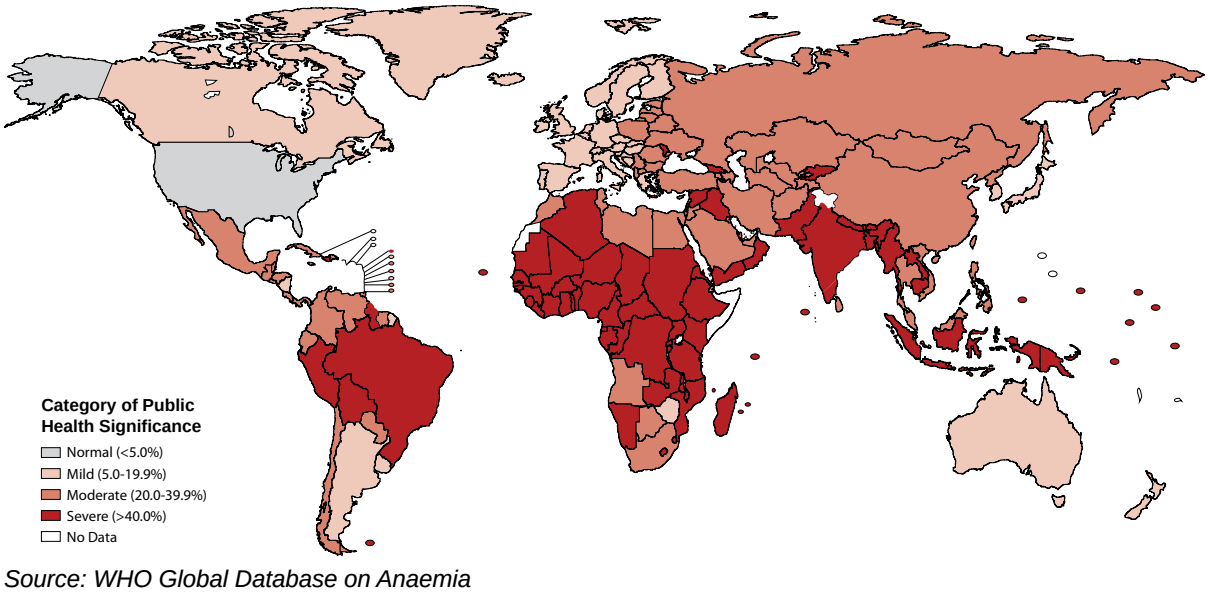
2.1. Global Overview

The WHO Global Database on Anaemia for 1993–2005, covering almost half the world's population, estimated the prevalence of anaemia worldwide at 25 per cent[2]. Although the prevalence of anaemia is estimated at 9 per cent in countries with high development, in countries with low development the prevalence is 43 per cent[3]. In absolute numbers anaemia affects 1.62 billion people globally with about 293 million children of preschool age, 56 million pregnant women, and 468 million non-pregnant women estimated to be anaemic[2].

Children and women of reproductive age are most at risk, with global anaemia prevalence estimates of 47 per cent in children younger than 5 years, 42 per cent in pregnant women, and 30 per cent in non-pregnant women aged 15–49 years[3]. Africa and Asia account for more than 85 per cent of the absolute anaemia burden in high-risk groups and India is the worst hit (Table 2.1).

Anaemia is estimated to contribute to more than 115,000 maternal deaths and 591,000 perinatal deaths globally per year[4]. Analysis of data on global prevalence shows that anaemia is disproportionately concentrated in low socioeconomic groups, and that maternal anaemia is strongly associated with child anaemia.

Fig. 2.1: Global picture – Anaemia as a public health problem in preschool children by country



Source: WHO Global Database on Anaemia

Table 2.1: Prevalence of anaemia in India and neighbouring countries

Country	Proportion of population with anaemia (Hb <11 g/dl)	Public health problem
Bangladesh	47.0	Severe
Bhutan	80.6	Severe
India	74.3	Severe
Nepal	78.0	Severe
Pakistan	50.9	Severe
Sri Lanka	29.9	Moderate

Source: WHO Global Database on Anaemia

2.2. Indian Scenario

India is one of the countries with very high prevalence of anaemia in the world. Almost 58 per cent of pregnant women in India are anaemic and it is estimated that anaemia is the underlying cause for 20–40 per cent of maternal deaths in India. India contributes to about 80 per cent of the maternal deaths due to anaemia in South Asia[5].

Nutritional anaemia is a major public health problem in India and is primarily due to iron deficiency. The National Family Health Survey-3 (NFHS-3) data suggests that anaemia is widely prevalent among all age groups, and is particularly high among the most vulnerable – nearly 58 per cent among pregnant women, 50 per cent among non-pregnant non-lactating women, 56 per cent among adolescent girls (15–19 years), 30 per cent among adolescent boys and around 80 per cent among children under 3 years of age (Table 2.2).

Table 2.2: Prevalence of anaemia among different age groups

Age groups	Prevalence of anaemia (%)
Children (6–35 months)	79
Children (6–59 months)	69.5
All women (15–49 years)	55.3
Ever married women (15–49 years)	56
Pregnant women (15–49 years)	58.7
Lactating women (15–49 years)	63.2
Adolescent Girls	
12–14 years	68.6*
15–17 years	69.7*
15–19 years	55.8

Source: NFHS-3
**National Nutrition Monitoring Bureau Survey (NNMBS), 2006*

2.2.1 Trends in anaemia prevalence

Anaemia prevalence in under-5 children

Seven out of every 10 children aged 6-59 months in India are anaemic – 3 per cent are severely anaemic, 40 per cent are moderately anaemic, and 26 per cent are mildly anaemic. The prevalence of anaemia ranges from 38 per cent in Goa to 78 per cent in Bihar. More than half of young children in 24 states have anaemia, including 11 states where more than two thirds of children are anaemic.

The prevalence of anaemia has actually increased from NFHS-2 to NFHS-3. The percentage of children with any anaemia increased from 74.3 per cent in NFHS-2 to 78.9 per cent in NFHS-3 (Table 2.3). In the period between the two surveys, there was an increase in the prevalence of mild anaemia (from 23% to 26%) and moderate anaemia (from 46% to 49%).

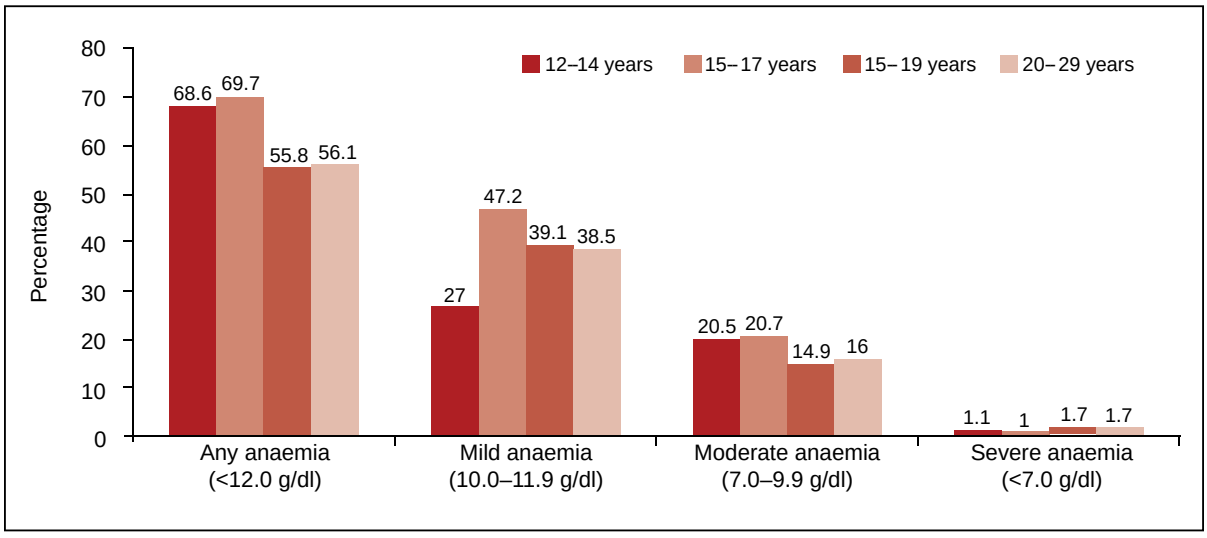
Table 2.3: Prevalence of anaemia among children aged 6 to 35 months (per cent)

Anaemia level	NFHS-2			NFHS-3		
	Urban	Rural	Total	Urban	Rural	Total
Mild (10.0–10.9 g/dl)	23.7	22.7	22.9	25.8	25.7	25.7
Moderate (7.0–9.9 g/dl)	42.0	47.1	45.9	42.0	51.7	49.4
Severe (<7.0 g/dl)	5.1	5.5	5.4	4.4	3.5	3.7
Any anaemia (<11.0 g/dl)	70.8	75.3	74.3	72.2	80.9	78.9

Prevalence of anaemia among adolescent girls and boys

The prevalence of anaemia among girls (Hb <12 g%) and boys (Hb <13 g%) is alarmingly high as per the reports of NFHS-3 and the National Nutrition Monitoring Bureau Survey (NNMBS). As indicated in Figure 2.2, over 55 per cent of adolescent girls are anaemic. Percentage prevalence of anaemia among adolescent girls in the age group 15–19 years and in the older age group 20–29 years remains almost stagnant at 55.8 per cent and 56.1 per cent respectively. On the other hand, among adolescent boys, prevalence of anaemia for the age group 15–19 years is higher (30.2%) than the post-adolescence stage (19.3 per cent for the age group 20–29 years).

Fig. 2.2: Prevalence of anaemia among adolescent girls (12–19 years) and young women (20–29 years) in India[6,7]

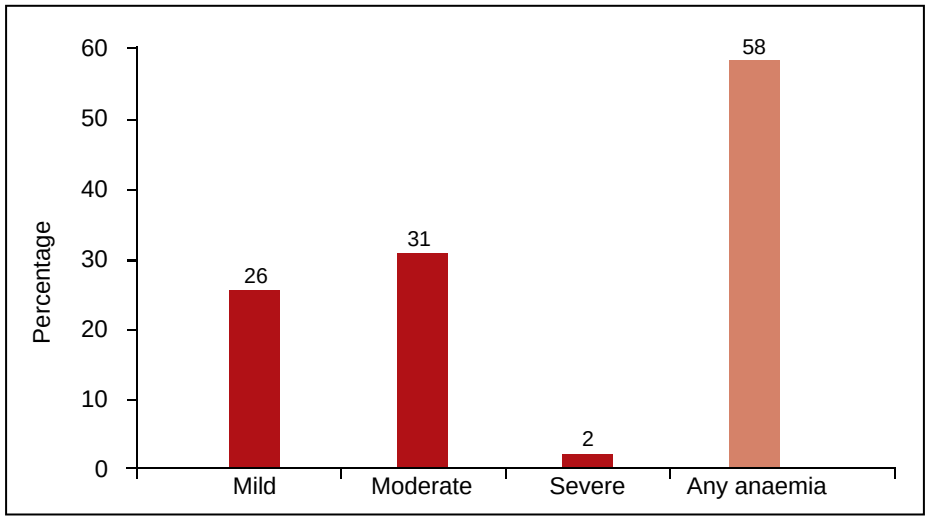


Source: NFHS-3, 2005-06 and the National Nutrition Monitoring Bureau Survey (NNMBS), 2006

Prevalence of anaemia among pregnant women, men and women of reproductive age (WRA)

Anaemia is a major health problem for adults as well, affecting 55 per cent of women, 58 per cent of pregnant women and 24 per cent of men. The prevalence of anaemia among ever married women increased from 52 per cent in NFHS-2 to 56 per cent in NFHS-3 (Figure 2.3).

Fig. 2.3: Prevalence of anaemia among pregnant women



Source: NFHS-3, 2005-06

Children: Causes of Nutritional Anaemia

- Low iron stores at birth due to anaemia in mother
- Non-exclusive breastfeeding
- Too early introduction of inappropriate complementary food (resulting in diminished breast milk intake, insufficient iron intake, and heightened risk of intestinal infections)
- Late introduction of appropriate (iron-rich) complementary foods
- Insufficient quantity of iron and iron enhancers in diet, and low bioavailability of dietary iron (e.g. non-haem iron)
- Increased iron requirements related to rapid growth and development during infancy and childhood
- Iron loss due to parasite load (e.g. malaria, intestinal worms)
- Poor environmental sanitation, unsafe drinking water and inadequate personal hygiene

Women: Causes of Nutritional Anaemia

- Insufficient quantity of iron-rich foods and "iron enhancers" in the diet (foods rich in vitamin C such as citrus fruits), and low bioavailability of dietary iron (e.g., foods containing only non-haem iron)
- Excessive quantity of "iron inhibitors" in diet, especially during mealtimes (e.g., tea, coffee; calcium-rich foods)
- Iron loss during menstruation
- Poor iron stores from infancy, childhood deficiencies and adolescent anaemia
- Iron loss from post-partum haemorrhage
- Increased iron requirement due to tissue, blood and energy requirements during pregnancy
- Teenage pregnancy
- Repeated pregnancies with less than 2 years' interval
- Iron loss due to parasite load (e.g., malaria, intestinal worms)
- Poor environmental sanitation and unsafe drinking water

3

Impact of Anaemia on Health Outcomes

Anaemia has major consequences on human health as well as social and economic development. Anaemia is the world's second leading cause of disability and is responsible for about 1 million deaths a year, of which three-quarters occur in Africa and South-east Asia[8]. In terms of lost years of healthy life, Iron Deficiency Anaemia causes 25 million cases of Disability Adjusted Life Years (DALYs); this accounts for 2.4 per cent of the total DALYs worldwide[9]. In the World Health Organisation (WHO)/World Bank rankings, IDA is the third leading cause of DALYs lost for females aged 15–44 years[10,11]. Physical and cognitive losses due to IDA cost developing countries up to 4.05 per cent loss in gross domestic product (GDP) per annum, thereby stalling social and economic development[12]. When results are expressed as a percentage of GDP these losses are 1.18 per cent of GDP in India. In absolute dollar terms, the losses in South Asia are staggering: close to $4.2 billion annually in Bangladesh, India and Pakistan[12].

In young children, iron deficiency is due to increased iron requirement during periods of rapid growth, which are almost 10 times higher per kilogram of body weight than that of an adult male. In addition, infant and toddler diets are often poor in bio-available iron, particularly post-weaning. Children who suffer from anaemia have delayed psychomotor development and impaired performance; in addition, they experience impaired coordination of language and motor skills, equivalent to a 5–10 point deficit in intelligence quotient[13]. Even though retarded psychomotor and cognitive development may be subtle in an individual child and therefore not really a presenting symptom as such, there is increasing evidence that marked iron deficiency can cause significant central nervous system (CNS) damage even in the absence of anaemia. There seems to be a vulnerable period for these damages particularly between 9 and 18 months of age. An even more important issue is that some research has suggested that this damage may not always be reversible even when iron stores are corrected in the early stages of iron deficiency.

The consequences of anaemia in women are enormous as the condition adversely affects both their productive and reproductive capabilities. Among women, iron deficiency prevalence is higher than among men due to menstrual iron losses and the extreme iron demands of a growing foetus during pregnancies, which are approximately two times the demands in the non-pregnant state. Worldwide, it is estimated that about 20 per cent of maternal deaths are caused by anaemia; in addition, anaemia contributes partly to 50 per cent of all maternal

deaths[14]. First, anaemia reduces women's energy and capacity for work and can therefore threaten household food security and income. Second, severe anaemia in pregnancy impairs oxygen delivery to the foetus and interferes with normal intra-uterine growth, resulting in intra-uterine growth retardation, stillbirth, LBW and neonatal deaths. Therefore, anaemia is a major contributor to poor pregnancy and birth outcomes in developing countries as it predisposes to premature delivery, increased perinatal mortality and increased risk of death during delivery and postpartum.

4

Existing Policies and Strategies

A National Nutrition Policy was adopted in 1993, with the objective of operationalising multi-sectoral strategies to address the problem of under-nutrition/malnutrition. Based on this, the National Plan of Action on Nutrition 1995 laid out the sectoral Plan of Action for 14 Ministries and Departments of the Government of India. A National Nutrition Mission has been set up to address nutrition issues through a mission mode approach under the oversight of the Ministry of Women & Child Development (MWCD).

One of the goals for the 12th Five Year Plan is to reduce anaemia in girls and women by 50 per cent.

4.1. Supplementation Interventions by Ministry of Health and Family Welfare (MoHFW)

	Children		Adolescents 10–19 years (recently introduced)	Pregnant and lactating women
	0–5 years	6–10 years		
IFA supplementation.	20 mg elemental iron and 100 microgram (mcg) folic acid per ml of liquid formulation and age appropriate de-worming for 100 days	30 mg elemental iron and 250 mcg folic acid per child per day for 100 days in a year	Weekly dose of 100 mg elemental iron and 500 mcg folic acid with biannual de-worming	100 mg of elemental iron and 500 mcg of folic acid daily for 100 days during pregnancy. Followed by same dose for 100 days in the post-partum period
Long Lasting Insecticide Nets (LLINs)/Insecticide Treated Bed Nets (ITBNs) are also provided to pregnant women.				

4.2. Key Programmes and Schemes of Other Ministries

- Under the Integrated Child Development Services (ICDS) Scheme of MWCD, supplementary nutrition is provided to pregnant and lactating women at the rate of Rs. 5 per day per woman. This is meant to provide 600 Kcal and 18–20 grams of protein. Children in the age group 0–6 years receive supplementary nutrition, immunisation, preschool education, etc.
- Supplementary food is also provided to primary school children through the National Programme of Nutritional Support to Primary Education (Mid-day Meal programme).

- Other schemes of the MWCD, for example SABLA, where supplementary nutrition is provided to adolescent girls (AGs) in the form of take home rations (THR) or hot cooked meals. Under SABLA, each AG will be given at least 600 calories and 18–20 grams of protein and the recommended daily intake of micronutrients, at Rs 5 per day per beneficiary, for 300 days in a year.

Even though supplementation of diet with iron and folic acid (IFA) has been a part of Government of India programming for over three decades, NFHS data shows that the levels of IFA intake remain low. For example, less than 20 per cent of women below 20 years took IFA supplements, and only 22 per cent of pregnant women reported consuming IFA for 90 days or more when they were pregnant. There are significant challenges in reaching the at-risk population as well as improving compliance.

4.3. National Iron+ Initiative

Taking cognizance of ground realities discussed above the Ministry of Health and Family Welfare took a policy decision to develop the National Iron+ Initiative. This initiative will bring together existing programmes (IFA supplementation for: pregnant and lactating women and; children in the age group of 6–60 months) and introduce new age groups. Thus National Iron+ Initiative will reach the following age groups for supplementation or preventive programming:

- Bi-weekly iron supplementation for preschool children 6 months to 5 years
- Weekly supplementation for children from 1st to 5th grade in Govt. & Govt. Aided schools
- Weekly supplementation for out of school children (5–10 years) at Anganwadi Centres
- Weekly supplementation for adolescents (10–19 years)
- Pregnant and lactating women
- Weekly supplementation for women in reproductive age

Establishing a continuum of care, the National Iron+ Initiative also defines a minimums service of packages for treatment and management of anaemia across levels of care. Platforms and services at each level have also been mapped out and service providers' roles and responsibilities detailed.

Since anaemia is not just about medical interventions but to a great degree about behaviour change (both in terms of dietary habits and compliance) an extensive communication campaign will be developed. A conscious effort has already been made under WIFS programme to position the supplementation positively in order to reach out to both boys and girls and ensure compliance. IFA tablet has been made blue ('*Iron ki nili goli*') to distinguish it from the red IFA tablet for pregnant and lactating women. The campaign has been built around benefits of IFA supplementation and healthy eating. The scope of this communication campaign will be enhanced to address all target segments.

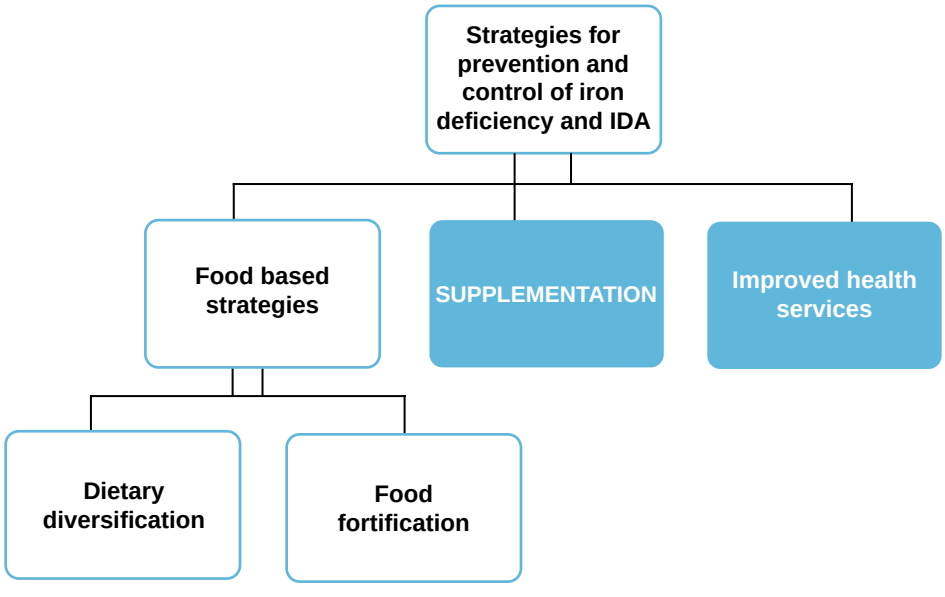
5

Approach – What Would It Take to Fight Iron Deficiency and IDA More Effectively?

Anaemia is a multi-factorial disorder that requires a multi-pronged approach for its prevention and treatment. Iron deficiency and infections are the most prevalent aetiological factors. However, other conditions may have a contributory role. The Copenhagen Consensus (2004) panel of eminent economists concluded that the returns of investing in micronutrient programmes (including iron), among a list of 17 possible development investments, are second only to those of fighting HIV/AIDS. The benefit-to-cost ratio of iron interventions based on resource savings, improvement in cognitive development and schooling, and physical productivity was estimated to be as high as 200:1.

Prevention of both iron deficiency and anaemia require approaches that address all the potential causative factors. Interventions to prevent and correct iron deficiency and IDA, therefore, must include measures to increase iron intake through food-based approaches, namely dietary diversification and food fortification with iron; iron supplementation and improved health services and sanitation (Figure 5.1).

Fig. 5.1: Interventions to prevent and correct iron deficiency and IDA



Source: Iron deficiency anaemia: assessment, prevention and control. A guide for Programme Managers; WHO 2001- WHO/NHD/01.3

5.1. What Are Diet Diversification, Food Fortification and Supplementation?

5.1.1 Dietary diversification

Dietary diversification is encouraging the consumption of micronutrient rich foods – dark green leafy vegetables, lentils and vitamin C rich fruits – which may be available but are under-utilised by the deficient population (See Annexure 1).

5.1.2 Food fortification

Food fortification refers to the addition of micronutrients to processed foods. In many situations, this strategy can lead to relatively rapid improvements in the micronutrient status of a population, and at a very reasonable cost, especially if advantage can be taken of existing technology and local distribution networks.

5.1.3 Supplementation

Food supplements are highly concentrated vitamins and minerals produced by pharmaceutical manufacturers in the form of capsules, tablets or injections and administered as part of health care or specific nutrition campaigns.

5.2. Ministry of Health and Family Welfare's Revised Strategy

Even though food-based approaches to increasing iron intake through food fortification and dietary diversification are deemed as important and sustainable strategies for preventing iron deficiency and IDA in the general population, it is not easy to change food habits or ensure access to iron rich foods as diets in India are primarily cereal based and bioavailability of iron from such diets is limited. On the other hand, iron from dietary animal sources (haem iron) is better in terms of bioavailability but consumption is rather low or nil due to social reasons and poverty.

In such a scenario, where it is difficult to influence dietary behaviour, the key step towards addressing iron deficiency and IDA would be the implementation and scaling up of the IFA Supplementation programme and management of all forms (mild, moderate and severe) of IDA.

The strategy for control and prevention of IDA would be provision of IFA supplementation and therapeutic management of mild, moderate and severe anaemia in the most vulnerable groups – children, adolescents, pregnant and lactating mothers and women.

6

Supplementation through the Life Cycle

An anaemia supplementation programme across the life cycle is proposed in which beneficiaries will receive iron and folic acid supplementation irrespective of their iron/Hb status. The age-specific interventions are based on WHO recommendations, synthesis of global evidence on IFA supplementation and the recommendations of national experts (Table 6.1 and Figure 6.1).

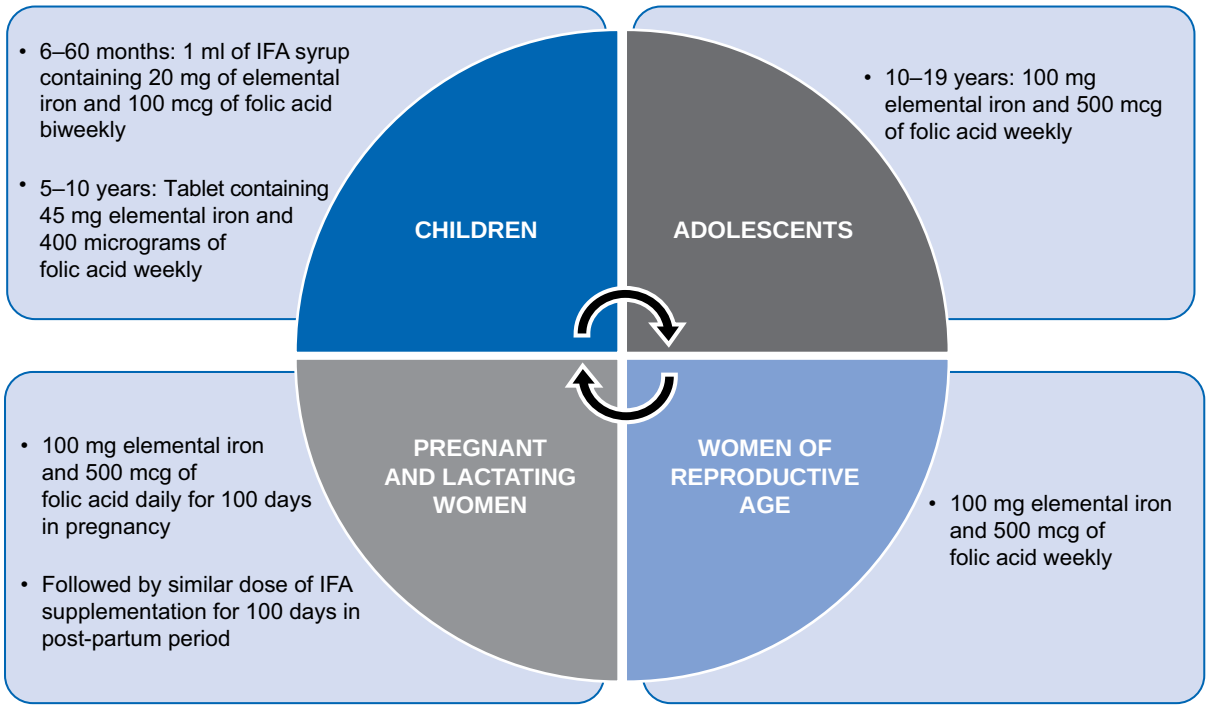
Table 6.1: IFA supplementation programme and service delivery

Age group	Intervention/Dose	Regime	Service delivery
6–60 months	1ml of IFA syrup containing 20 mg of elemental iron and 100 mcg of folic acid	Biweekly throughout the period 6–60 months of age and de-worming for children 12 months and above.	Through ASHA Inclusion in MCP card
5–10 years	Tablets of 45 mg elemental iron and 400 mcg of folic acid	Weekly throughout the period 5–10 years of age and biannual de-worming	In school through teachers and for out-of-school children through Anganwadi centre (AWC) Mobilization by ASHA
10–19 years	100 mg elemental iron and 500 mcg of folic acid	Weekly throughout the period 10–19 years of age and biannual de-worming	In school through teachers and for those out-of-school through AWC Mobilization by ASHA
Pregnant and lactating women	100 mg elemental iron and 500 mcg of folic acid	1 tablet daily for 100 days, starting after the first trimester, at 14–16 weeks of gestation. To be repeated for 100 days post-partum.	ANC/ ANM /ASHA Inclusion in MCP card
Women in reproductive age (WRA) group	100 mg elemental iron and 500 mcg of folic acid	Weekly throughout the reproductive period	Through ASHA during house visit for contraceptive distribution

ASHA to be suitably incentivized for provision IFA supplements to beneficiary

Note: The IFA supplementation programme is a preventive public health measure and should not be confused with treatment of IDA which is dealt with in the subsequent section.

Fig. 6.1: IFA supplementation programme



Overview of Implementation Modalities for IFA Supplementation for Each Target Segment

6.1. Supplementation for Children 6–60 months

The onset of anaemia in young children is generally after 6 months of age. Before this, iron in breast milk is sufficient to meet the needs of a breastfed child. Iron from breast milk is also in a form that is more easily bio-available to the young child. Thereafter the incidence of anaemia increases from 6–8 months till the child is 1 year old. In India, diets for children in the age group 6–23 months are predominantly plant-based and provide insufficient amounts of micronutrients to meet the recommended nutrient intakes.

The following intervention is proposed for this target segment.

Dose and Regime

One ml of IFA syrup containing 20 mg of elemental iron and 100 mcg of folic acid biweekly for 100 doses in a year. Iron folic acid supplements will be supplied in bottles of 100 ml each and composition, preparation, dose and duration of IFA supplementation will remain same as the existing guidelines. The bottles should have an auto-dispenser so that only 1 ml of syrup will be dispensed at a time.

Albendazole tablets will be provided to children for biannual de-worming as per Table 6.2.

Table 6.2: Dosage of Albendazole tablets for biannual de-worming

Age	Dose (Albendazole 400 mg tablet)	
1–2 years	Half tablet	Appropriate administration of tablets to children between the ages of 1 and 3 years is important. The tablet should be broken and crushed between two spoons, then safe water added to help administer the drug
2 years upwards	One tablet	

Note: **Prophylaxis with iron should be withheld in case of acute illness (fever, acute diarrhoea, pneumonia etc.), Severe Acute Malnutrition (SAM) and in a known case of haemoglobinopathy/ history of repeated blood transfusion.**

Implementation

For all children aged 6 to 60 months it is proposed that IFA supplement will be administered under the direct supervision of an Accredited Social Health Activist (ASHA) on fixed days on a biweekly basis. The micro plan for reaching out to these children can be worked out at village level. It is recommended that a particular child should receive the supplement on the fixed day (Monday and Thursday), though it can vary for the groups of children depending on the home visits schedule prepared at block/district level. The nutritional status of children should be assessed by MUAC (Mid Upper Arm Circumference less than 11.5 cm) to ensure that IFA syrup is not given to children with Severe Acute Malnutrition (SAM).

ASHA would give IFA syrup bottles to mothers for safe storage and to lessen the logistic hurdle of carrying bottles around, but the IFA syrup will be administered under her direct supervision only. During the visits, the ASHA will also advise/inform the caregiver about the following issues:

- Time of administration – half an hour after food if the child has been breastfed (in LBW infants)/fed semisolid/solid food
- Benefits of regular intake of IFA syrup in physical and cognitive development of the child e.g. improvement in well-being, attentiveness in studies and intelligence etc.
- Minor side effects associated with IFA administration such as black discolouration of stools.
- Preservation of IFA bottle – in a cool and dark place, away from reach of children, keeping the lid of the bottle tightly closed each time after administration, etc.

Note: ASHAs/frontline workers/caregivers should be specifically instructed to administer IFA supplement half an hour after the child has been breastfed (in LBW infants)/fed semisolid/solid food.

Details of IFA supplementation will be included in the Mother and Child Protection (MCP) Card.

ASHAs will be suitably incentivised for undertaking this activity.

6.2. Supplementation for Children 5 (61 months onward)–10 years

Iron deficiency during childhood is often caused by inadequate dietary intake, absorption or utilisation of iron, increased iron requirements during the growth period, or blood loss due to parasitic infections such as malaria and soil-transmitted worm infestations.

The following intervention is proposed for this age group.

Dose and Regime

Tablets containing 45 mg of elemental iron and 400 mcg of folic acid would be given once a week throughout the 5–10 years period. In addition to IFA supplements, Albendazole (400 mg) tablets for de-worming are to be administered twice a year for anti-helminthic treatment

Note: Prophylaxis with iron should be withheld in case of acute illness (fever, acute diarrhoea, pneumonia etc), severe acute malnutrition and in a known case of haemoglobinopathy/history of repeated blood transfusion.

Implementation

The platform of school and AWC would be utilised to provide IFA supplementation and de-worming tablets to children in the age group 5–10 years through involvement of teachers and Anganwadi workers (AWWs). ASHA would be involved in mobilization of these children at community level.

Teachers and AWWs, ASHA could be incentivised to undertake this activity.

Other measures to prevent anaemia in children

Besides the provision of micronutrient supplements, the following measures need to be taken simultaneously as long-term measures to prevent IDA in children:

- Promotion of exclusive breastfeeding for the first 6 months of life
- Appropriate and adequate complementary feeding with iron rich foods till 2 years of age (See Annexure 3)
- Dietary diversification to include foods rich in absorbable vitamins and minerals
- Diagnosis and control and treatment of parasitic infections

6.3. Weekly Iron and Folic Acid Supplementation (WIFS) Programme for Adolescent Girls and Boys (10–19 Years)

Adolescents (age 10–19 years) are at high risk of iron deficiency and anaemia due to accelerated increase in requirements for iron, poor dietary intake of iron, high rate of infection and worm infestation as well as the social norm of early marriage and adolescent pregnancy. During this stage the requirement of nutrition and micronutrients is relatively high. Therefore, adolescents, especially girls, particularly those between the ages of 12–15 years, are vulnerable to iron deficiency mainly because requirements are at a peak. Evidence from many countries across the globe suggests that a weekly IFA supplement is as efficacious as daily supplements with a much lower rate of side effects.

For this target segment the following interventions are proposed:

- Administration of supervised weekly IFA supplementation (100 mg elemental iron and 500 mcg folic acid) throughout the calendar year, i.e., 52 weeks each year
- Albendazole (400 mg) tablets for biannual de-worming for helminthic control
- Screening of target groups for anaemia and referring these cases to an appropriate health facility
- Information and counselling for improving dietary intake and for taking action for prevention of intestinal worm infestation

Implementation modalities for WIFS

The WIFS programme will be implemented in urban and rural areas for adolescent boys and girls in school (10–19 years) through the platform of Government/Government aided/ municipal schools. WIFS will also reach out-of-school girls in the age group 10–19 years through the platform of Anganwadi Kendras.

The strategy involves a “fixed day – Monday” approach for IFA distribution. Teachers and AWWs will supervise the ingestion of the IFA tablet by the beneficiaries.

6.4. Pregnant Women and Lactating Mothers

Iron and folic acid tablets are being distributed through sub-centres, primary health centres (PHCs), community health centres (CHCs) and district hospitals (DHs) to all pregnant women and lactating mothers.

Dose and regimen

IFA supplementation (100 mg elemental iron and 500 mcg of folic acid) every day for at least 100 days, starting after the first trimester, at 14–16 weeks of gestation followed by the same dose for 100 days in post-partum period. Nutrition counselling is being provided during antenatal/postnatal check-ups and during monthly Village Health & Nutrition Day (VHND) to pregnant women and lactating mothers.

In addition to this, all women in the reproductive age group in the pre-conception period and up to the first trimester of the pregnancy are advised to have 400 mcg of folic acid tablets to reduce the incidence of neural tube defects in the foetus.

Implementation

Provision of IFA tablets to pregnant women will be during routine antenatal visits at subcentre/ PHC/CHC/DH.

ASHA to ensure provision of IFA supplements to pregnant women who are not able to come for regular antenatal checkups through home visits. She will also monitor compliance of IFA tablets consumption through weekly house visits.

ASHA to be suitably incentivized for this activity.

6.5. Women in Reproductive Age Group (WRA) (15–45 Years)

Women of reproductive age are at increased risk of anaemia because of chronic iron depletion during the menstrual cycle, inadequate dietary intakes and recurrent infections. Given the intensity of the problem in the country, intermittent IFA supplementation to all menstruating women would be a cost effective strategy to build up iron stores and prevent anaemia.

The following intervention is proposed for them:

- IFA supplementation (100 mg elemental iron and 500 mcg of folic acid) throughout the calendar year, i.e., 52 weeks, each year
- Albendazole (400 mg) tablets for biannual de-worming for helminthic control

ASHA to distribute IFA supplements to women in reproductive age group during doorstep distribution of contraceptives.

Note: **All health facilities to have adequate supply of IFA supplements for WRA.**

7

Therapeutic Approach through the Life Cycle

7.1. Six Months – 60 Months

ASHAs and ANMs will screen children from 6 months up to 5 years of age for signs of anaemia as per Integrated Management of Neonatal and Childhood Illness (IMNCI) Guidelines through opportunistic screening at

- VHNDs
- Immunisation sessions
- House-to-house visits by ASHAs for biweekly IFA supplementation
- Sick child coming to health facility (Sub-centre/PHC)

Screening through assessment of palmar pallor (as per IMNCI guidelines)
If the skin of child's palm is paler than that of others, the child will be referred to the appropriate health facility (PHC)/Mobile Medical Teams for Hb estimation and treatment of anaemia.

Facility level management

- Any child reporting to any facility (PHC level and above) with any illness will be assessed clinically by the attending Medical Officer for anaemia **routinely** and should undergo Hb estimation if found to be anaemic clinically
- All children referred from field (community, outreach, sub-centre) to PHC due to palmar pallor will undergo Hb level estimation before initiating treatment

Children will be categorised as having mild, moderate and severe anaemia on the basis of Hb levels and will be managed as per Table 7.1.

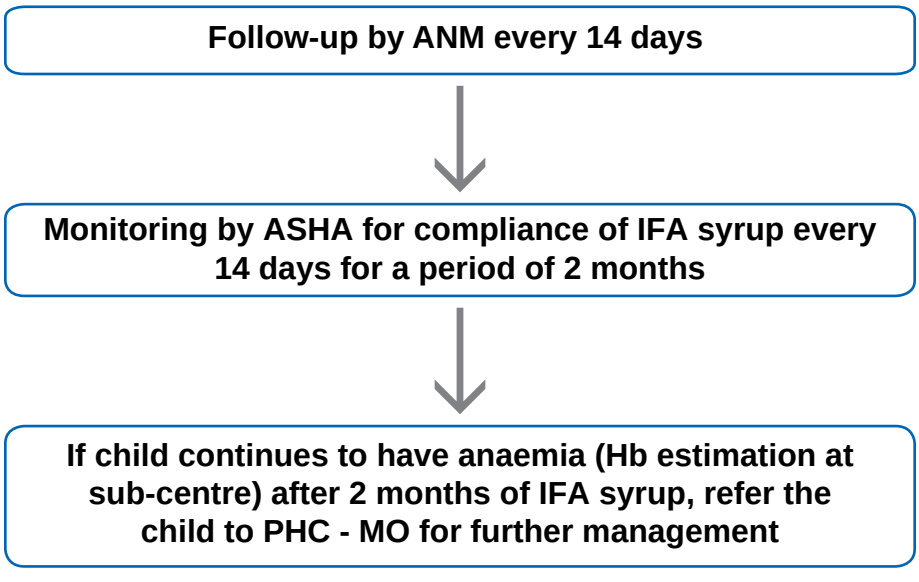
Table 7.1: Management of anaemia on the basis of haemoglobin levels in children 6 months–5 years

Level of Hb	Treatment	Follow-up	Referral
No Anaemia (>11 gm/dl)	20 mg of elemental iron and 100 mcg of folic acid in biweekly regimen		
Mild Anaemia (10–10.9 gm/dl)	3 mg of iron/ Kg/ day for 2 months	Follow-up every 14 days by ANM Hb estimation after completing 2 months of treatment to document Hb>11 gm/dl	In case the child has not responded to the treatment of anaemia with daily dose of iron for 2 months, refer the child to the FRU/DH with F-IMNCI trained MO/ Paediatrician/Physician for further investigation
Moderate Anaemia (7–9.9 gm/dl)	3 mg of iron/ Kg/ day for 2 months	Follow-up every 14 days by ANM Hb estimation after completing 2 months of treatment to document Hb >11 gm/dl	In case the child has not responded to the treatment of anaemia with daily dose of iron for 2 months, refer the child to the FRU/DH with F-IMNCI trained MO/ Paediatrician/Physician for further investigations
Severe Anaemia (<7 gm/dl)	Refer urgently to DH/FRU		

Table 7.2: Dose of IFA syrup for anaemic children 6 months–5 years

Age of child	Dose	Frequency
6 months–12 months (6–10 kg)	1 ml of IFA syrup	Once a day
1 year–3 years (10–14 kg)	1.5 ml of IFA syrup	Once a day
3 years–5 years (14–19 kg)	2 ml of IFA syrup	Once a day

Follow-up of children undergoing treatment of anaemia to be done by ANM



- After completion of treatment of anaemia and documenting Hb level >11 gm/dl, the IFA supplementation to be resumed.
- Treatment of anaemia with iron should be withheld in case of acute illness, Severe Acute Malnutrition and in a known case of haemoglobinopathy. Anaemia in these cases should be treated as per the standard treatment guidelines, by the attending physician, as per the merit of the individual case.

Management of severe anaemia at FRU/DH (as per F-IMNCI) in children 6 months–5 years

History to be taken for	Examination for
• Duration of symptoms • Usual diet (before the current illness) • Family circumstances (to understand the child's social background) • Prolonged fever • Worm infestation • Bleeding from any site • Any lumps in the body • Previous blood transfusions • Similar illness in the family (siblings)	• Severe palmar pallor • Skin bleeds (petechial and/or purpuric spots) • Lymphadenopathy • Hepato-splenomegaly • Signs of heart failure (gallop rhythm, raised JVP, respiratory distress, basal crepitations)

Investigations	Indication for blood transfusion	Blood transfusion
• Full blood count and examination of a thin film for cell morphology • Blood films for malaria parasites • Stool examination for ova, cyst and occult blood	• All children with Hb ≤4 gm/dl • Children with Hb 4–6 gm/dl with any of the following: – Dehydration – Shock – Impaired consciousness – Heart failure – Deep and laboured breathing – Very high parasitaemia (>10% of RBC)	• If packed cells are available, give 10 ml/kg over 3–4 hours preferably. If not, give whole blood 20 ml/kg over 3–4 hours.

Indications for further investigations and referral for management:

- Cases of anaemia and Hepato-splenomegaly/Splenomegaly, if malaria has been excluded or not strongly suspected
- Children with similar history in the family (siblings)
- Cases of anaemia with significant lymphadenopathy, bleeding manifestations
- Cases of anaemia with abnormal/immature cells or marked leucocytosis or bicytopenia or pancytopenia on smear examination
- Children who are not responding to adequate dose of iron/folate given for 2 weeks

7.2. Children 5–10 Years

Teachers and AWWs respectively will undertake screening for anaemia of in-school and out-of-school children in the age group 5–10 years. All children with clinical pallor will be referred to PHC/Mobile Medical teams for Hb estimation and treatment of anaemia. Children undergoing Hb estimation under Universal Screening Programme will also be referred to PHC/FRU/DH according to severity of anaemia for management.

Facility-level Management

- Any child reporting to any facility (PHC level and above) with any illness will be assessed clinically by the attending Medical Officer for anaemia routinely and should be advised Hb estimation if the child is found to be anaemic clinically.
- All children referred from community by AWW or ANM from sub-centre or from schools to PHC due palmar pallor will undergo Hb level estimation before initiating treatment.

Children will be categorised as having mild, moderate and severe anaemia on basis of Hb levels and for further management as per Table 7.3.

Table 7.3: Management of anaemia on the basis of haemoglobin levels in children 5–10 years

Level of Hb	Treatment	Follow-up	Referral
Mild Anaemia (11–11.4 gm/dl)	3 mg of iron/Kg/ day for 2 months	Follow-up every 14 days Hb estimation after completing 2 months of treatment to assess if Hb estimates are >11.5 gm/dl.	In case the child has not responded to the treatment of anaemia with daily dose of iron for 2 months, refer the child to the FRU/DH with F-IMNCI trained MO/Paediatrician/Physician for further investigation
Moderate Anaemia (8–10.9 gm/dl)	3 mg of iron/Kg/ day for 2 months	Follow-up every 14 days Hb estimation after completing 2 months of treatment to assess if Hb estimates are >11.5 gm/dl.	In case the child has not responded to the treatment of anaemia with daily dose of iron for 2 months, refer the child to the FRU/DH with F-IMNCI trained MO/Paediatrician/Physician for further investigations
Severe Anaemia (<8 gm/dl)	Refer urgently to DH/FRU		

Note:

- After completion of treatment of anaemia and attaining Hb level >11.5 gm/dl, the IFA supplementation to be resumed.
- Treatment of anaemia with iron should be withheld in case of acute illness, severe acute malnutrition and in a known case of haemoglobinopathy and anaemia in these cases should be treated as per the standard treatment guidelines, by the attending physician, as per the merit of the individual case.

Management of severe anaemia at FRU/DH in children 5–10 years

History taking for	Examination for
• Duration of symptoms • Usual diet (before the current illness) • Family circumstances (to understand the child's social background) • Prolonged fever • Worm infestation • Bleeding from any site • Any lumps in the body • Previous blood transfusions • Similar illness in the family (siblings)	• Severe palmar pallor • Skin bleeds (petechial and/or purpuric spots) • Lymphadenopathy • Hepato-splenomegaly • Signs of heart failure (gallop rhythm, raised JVP, respiratory distress, basal crepitations)

Investigations	Indication for blood transfusion	Blood transfusion
• Full blood count and examination of a thin film for cell morphology • Blood films for malaria parasites • Stool examination for ova, cyst and occult blood	• All children with Hb ≤4 gm/dl • Children with Hb 4-6 gm/dl with any of the following: – Dehydration – Shock – Impaired consciousness – Heart failure – Deep and laboured breathing – Very high parasitaemia (>10% of RBC)	If packed cells are available, give 10 ml/kg over 3-4 hours preferably. If not, give whole blood 20 ml/kg over 3-4 hours.

Indications for further investigations and referral for management:

- Cases of anaemia and Hepato-splenomegaly/Splenomegaly, if malaria has been excluded or not strongly suspected
- Children with similar history in the family (siblings)
- Cases of anaemia with significant lymphadenopathy, bleeding manifestations
- Cases of anaemia with abnormal/immature cells or marked leucocytosis or bicytopenia or pancytopenia on smear examination
- Children who are not responding to adequate dose of iron/folate given for 2 weeks

7.3. Adolescents in the Age Group 10–19 Years

Screening

Screening for anaemia in adolescents will be undertaken by teachers for in-school adolescents and by AWW for out-of-school adolescents by assessment of palmar, nail bed and tongue pallor. Adolescents with clinical pallor will be referred to PHC/Mobile medical teams for Hb testing and treatment.

Facility level management of anaemia in adolescents

All adolescents referred to PHC with pallor will undergo Hb level estimation before initiation of treatment. Adolescents will be categorised as having mild, moderate and severe anaemia on the basis of Hb levels and further management of anaemia will be as per Table 7.4.

Table 7.4: Management of anaemia on the basis of haemoglobin levels among adolescents 10–19 years

Level of Hb	Treatment	Follow-up	Indication for referral
Mild Anaemia (11–11.9 gm/dl)	60 mg of elemental iron daily for 3 months	Follow-up every month Hb estimation after completing 3 months of treatment to assess if Hb estimates are >12 gm/dl.	In case of no improvement in Hb levels after 3 months of treatment, adolescent will be referred to DH/FRU for further investigation
Moderate Anaemia (8–10.9 gm/dl)	60 mg of elemental iron daily for 3 months	Investigate Follow-up every 14 days Hb estimation after completing 3 months of treatment to assess if Hb estimates are >12 gm/dl.	In case of no improvement in Hb levels after 3 months of treatment, adolescent will be referred to DH/FRU for further investigation
Severe Anaemia (<8 gm/dl)	Refer **urgently** to DH/FRU	Severely anaemic adolescents would be line listed by ANM	

The moderately anaemic cases/adolescents with non-response to 3 months of iron will need the following investigations to determine the cause of anaemia:

- Complete blood counts
- Examination of peripheral blood smear
- Blood films to be examined for malaria parasites (particularly in high malaria risk areas)
- Stool examination for ova, cyst and occult blood

Table 7.5: Management of severely anaemic adolescents at FRU/DH

Investigations	Indication for blood transfusion	Blood transfusion
• Full blood count and examination of a thin film for cell morphology • Blood films for malaria parasites • Stool examination for ova, cyst and occult	• With Hb ≤4 gm/dl • With Hb 4-6 gm/dl with any of the following: – Dehydration – Shock – Impaired consciousness – Heart failure – Deep and laboured breathing – Very high parasitaemia (>10% of RBC)	If packed cells are available, give 10 ml/kg over 3–4 hours preferably. If not, give whole blood 20 ml/kg over 3–4 hours.

7.4. Pregnant and Lactating Women

Screening of all pregnant women for anaemia at sub-centre/VHND/outreach/PHC level can be done by Sahli's haemoglobinometer or by Standard Hb Colour Scale. Therapeutic dose of oral IFA supplementation can be initiated even on clinical signs and symptoms, however, such cases must be referred for confirmation of degree of anaemia through Hb testing and for further management as per Table 7.6.

Table 7.6: Management of anaemia on the basis of haemoglobin levels among pregnant and lactating women

Haemoglobin level	Level of facility	Therapeutic regimen
9–11 gm/dl	**Sub-centre** Signs and symptoms (generalised weakness, giddiness, breathlessness, etc.) Clinical examination (pallor eyelids, tongue, nail beds, palm, etc.) Confirmation by laboratory testing	**Hb level between 9–11 gm/dl** • 2 IFA tablets (1 in the morning and 1 in the evening) per day for at least 100 days (at least 200 tablets of IFA). • Hb levels should preferably be reassessed at monthly intervals. If on testing, Hb has come up to normal level, discontinue the treatment. • If it does not rise in spite of the administration of 2 tablets of IFA daily and dietary supplementation, refer the woman to the next higher health facility for further management.
7–9 gm/dl	**PHC/CHC** Signs and symptoms (generalised weakness, giddiness, breathlessness, etc.) Clinical examination (pallor of eyelids, tongue, nail beds, palm, etc.) Confirmation by laboratory testing	**Hb level between 8–9 gm/dl** • Before starting the treatment, the woman should be investigated to detect the cause of anaemia. • Oral IFA supplementation as for Hb level 9–11 gm/dl. Hb testing to be done every month. • Depending on the response to treatment, same course of action as prescribed for Hb level between 9–11 gm/dl. **Hb level between 7–8 gm/dl** • Before starting the treatment, the woman should be investigated to diagnose the cause of anaemia. • Injectable IM iron preparations (parenteral iron) should be given if iron deficiency is found to be the cause of anaemia. • IM iron therapy in divided doses along with oral folic acid daily if women do not have any obstetric or systemic complication; repeat Hb after 8 weeks. If the woman has become non-anaemic, no further medication is required: if Hb level is between 9–11 gm/dl, same regimen of oral IFA prescribed for this range. • If woman with Hb between 7–8 gm/dl comes to PHC/CHC in the third trimester of pregnancy, refer to FRU/MC for management.

Contd...

Haemoglobin level	Level of facility	Therapeutic regimen
		Multiple dose regime Intramuscular (IM) - Test dose of 0.5 ml given deep IM and woman observed for 1 hour. Iron dextran or iron sorbitol citrate complex given as 100 mg (2 ml) deep IM in gluteal region daily. Recommended dose is 1500–2000 mg (IM in divided doses) depending upon the body weight and Hb level If parenteral iron therapy is contraindicated e.g. in CHF, H/O allergy, asthma, eczema; Haemochromatosis, liver cirrhosis, rheumatoid arthritis and acute renal failure etc, refer the woman to FRU/MC
<7 gm/dl	FRU/DH/MC Signs and symptoms (generalised weakness, giddiness, breathlessness, etc.) Clinical examination (pallor eyelids, tongue, nail beds, palm, etc.) Confirmation by laboratory testing	**Hb level between 5-7 gm/dl** • Continue parenteral iron therapy as for Hb level between 7–8 gm/dl. Hb testing to be done after 8 weeks • If the woman becomes non-anaemic, no further medication is required: if Hb level is between 9–11 gm/dl, same regimen of oral IFA prescribed for this range • Depending on the further response to treatment, same course of action as prescribed for Hb level between 9–11 gm/dl **Hb level less than 5 gm/dl** • Evidence for injectable IV sucrose preparation: under Randomised Control Trial of GOI • Immediate hospitalisation irrespective of period of gestation in hospitals where round-the-clock specialist care is available for intensive personalised care and decision for blood transfusion (packed cell transfusion)

Pre-requisites for parenteral therapy

- Should be given under proper supervision
- After test dose only
- Close monitoring required
- Inj. Adrenaline, Hydrocortisone and oxygen to be available for management of anaphylactic reactions.
- Cardiopulmonary resuscitation facility to be available.
- Other indications for parenteral iron therapy are poor compliance or intolerance to oral iron therapy.

Post-partum/post-natal period

Regime of management of anaemia and dosage for IFA supplementation during post-partum period will depend on the degree of anaemia if this persists (as already given above), based on results of Hb assessment and as advised by the treating doctor. If the woman is non-anaemic in post-partum period, prophylactic regime (1 tablet per day for 100 days) should be given.

Compliance

- Ensure availability of IFA tablets at all levels
- Provision of tablets to pregnant women in time
- Regular tracking of pregnant women for ANC checkups including Hb testing and completion of treatment
- Counselling of pregnant women on the common side-effects of IFA supplementation, general myths associated with intake of IFA tablets, related risk if anaemia not treated, etc
- Provision of incentives to frontline health workforce for completion of treatment resulting in rise of Hb level to normal level

Precautions for oral therapy

- Intake of doses as per regime, should be taken regularly and must complete the treatment
- Ideally, tablets should be taken on empty stomach for better absorption. In case of gastritis, nausea, vomiting etc., advise to take one hour after meal or at night
- If constipation occurs, advise to drink more water and add roughage to diet
- IFA tablets should not be consumed with tea, coffee, milk or calcium tablets
- IFA treatment should always supplemented with diet rich in iron, vitamins (particularly Vitamin C), protein, minerals and other nutrients e.g. green leafy vegetables, whole pulses, jaggery, meat, poultry and fish, fruits and black gram, groundnuts, *ragi*, whole grains, milk, eggs, meat and nuts, etc.

Role of ANM and MO

- Detection of anaemia by blood testing for Hb
- Provide IFA tablets to the pregnant women as per GOI Guidelines
- Treat pregnant women with mild to moderate anaemia at SC/PHC
- Hb estimation after a month of starting of therapeutic regime of treatment and reassessment to continue or modify the treatment regime as per GOI Guidelines
- Counselling of pregnant women on the common side effects of IFA supplementation, general myths associated with intake of IFA tablets, related risk if anaemia not treated, etc
- Dietary counselling of pregnant women (increase intake of iron-rich foods such as green leafy vegetables, whole pulses, jaggery, meat, poultry and fish. Advise to take fruits and vegetables containing vitamin C in diet as these enhance the absorption of iron in the diet, high protein diet, including items such as black gram, groundnuts, *ragi*, whole grains, milk, eggs, meat and nuts, etc.)
- Filling of all the information (Hb level and treatment regime – IFA supplementation) in MCP cards
- Line listing of severely anaemic pregnant women for tracking of treatment of anaemia and micro birth planning

Specific role of ASHA

- Preventive IFA supplementation to every pregnant woman
- Identification of anaemic women during pregnancy and post-partum period through routine and outreach activities and VHNDs
- Bringing these identified women to institutions for diagnosis and treatment
- Ensure regular intake of IFA for treatment of anaemia as advised by ANM/MO/ Specialist etc
- Ensure follow-up visits by pregnant women at the scheduled time to the health facility/ VHND/outreach activity site
- Provide appropriate and supportive care for anaemia
- Counselling pregnant women on the common side effects of IFA supplementation, general myths associated with intake of IFA tablets, related risk if anaemia not treated, etc
- Dietary counselling of pregnant women (increase intake of iron-rich foods such as green leafy vegetables, whole pulses, jaggery, meat, poultry and fish. Advise to take fruits and vegetables containing vitamin C in diet as these enhance the absorption of iron in the diet, high protein diet, including items such as black gram, groundnuts, *ragi*, whole grains, milk, eggs, meat and nuts, etc.)

Specific role of ANM

- Refer pregnant women to next higher health facility that is equipped to manage complications in pregnancy when:
  - Hb <8 gm/dl
  - There is poor compliance or intolerance to oral iron therapy in mild to moderate anaemic pregnant women
  - Hb level does not rise in spite of taking treatment (IFA tablets in the prescribed dose) for a month

Specific role of MO

- All mild and moderate anaemic pregnant women to be treated at PHC/CHC and severely anaemic at FRU
- Prepare line list of severely anaemic pregnant women and submit it to district CMO
- Treatment and follow up of line listed pregnant women
- Train and orient ANMs and lady health visitors (LHVs) on the detection and treatment of anaemia and supervise them

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Annexure 1

Dietary Diversification for Prevention of Nutritional Anaemia

To achieve dietary adequacy of iron by using food-based approaches, food preparation and dietary practices must be considered. As iron is low in cereal and tuber-based diets, the addition of legumes can slightly improve the iron content of those diets. However, the bio-availability of this non-haem iron source is low. Therefore, it is not possible to meet the recommended levels of iron and zinc in the staple-based diets through a food-based approach unless some meat, poultry, or fish is included. For example adding a small portion (50 g) of meat, poultry, or fish will increase the total iron content as well as the amount of bio-available iron. The consumption of ascorbic acid along with the food rich in iron will enhance absorption. There is a critical balance between enhancers and inhibitors of iron absorption.

For iron bio-availability it is essential to reduce the intake of inhibitors of iron absorption and to increase the intake of enhancers of absorption in a given meal. Nutritional status can be improved significantly by educating households on food preparation practices which minimise the consumption of inhibitors of iron absorption. It is also important to recommend that vegetables rich in vitamin C, folate, and other water-soluble or heat-labile vitamins be minimally cooked in small amounts of water. Following this strategy, it is recommended to increase the intake of germinated seeds, fermented cereals, heat-processed cereals, meats, and fruits and vegetables rich in vitamin C and to encourage the consumption of tea, coffee, chocolate, or herbal teas at times other than with meals. Therefore, the adequacy – i. e. bioavailability – of iron in usual diets can be improved by altering meal patterns to favour enhancers, lower inhibitors, or both.

Enhancers	Inhibitors
• Haem iron, present in meat, poultry, fish, and seafood • Ascorbic acid or vitamin C, present in fruits, juices, potatoes and some other tubers, and other vegetables such as green leaves, cauliflower, and cabbage • Fermented or germinated food	• Cereal bran, cereal grains, high-extraction flour, legumes, nuts, and seeds • Tea, coffee, cocoa, herbal infusions in general, certain spices (e.g. oregano) • Calcium, particularly from milk and milk products

Common Iron Rich Foods

Chickpea *Chana Sag*		Spinach *Palak*	
Amaranth *Kantewali Chaulai*		Onion Stalks *Pyaz ki kali*	
Mustard Leaves *Sarson ka sag*		Fenugreek Leaves *Methi*	
Mint *Pudina*		Colocasia leaves *Arvi Ka Sag*	
Lentil *Dal*		Bengal Gram, Whole *Kala chana*	
Soyabean		Gingelly Seeds *Til*	

Red Gram Dhal *Arhar*		Plantain Green *Kuchcha Kela*	
Black Gram, Dhal *Urad Dal or Kaskalay*		Water Melon *Tarbooz*	
Pumpkin *Seethaphal*		Mutton *Gosht*	

Common Vitamin C Rich Foods

Cabbage *Patta Gobhi*		Drumstick Leaves *Saijan Patta*	
Coriander Leaves *Dhaniya*		Gooseberry *Amla*	

Annexure 2

Amount of Food to Offer at Different Ages

Age	Energy needed per day in addition to breast milk	Texture	Frequency	Average amount of each meal
6–8 months	200	Start with thick porridge, well mashed foods	2–3 meals per day plus frequent breastfeed	Start with 2–3 tablespoonfuls
9–11 months	300	Finely chopped or mashed foods, and foods that baby can pick up	3–4 meals plus breastfeed. Depending on appetite offer 1–2 snacks	½ of a 250 ml cup/bowl
12–23 months	550	Family foods, chopped or mashed if necessary	3–4 meals plus breastfeed. Depending on appetite offer 1–2 snacks	3/4 to one 250 ml cup/bowl

If baby is not breastfed, give in addition: 1–2 cups of milk per day, and 1–2 extra meals per day. The amounts of food included in the table are recommended when the energy density of the meals is about 0.8 to 1.0 Kcal/g. If the energy density of the meals is about 0.6 Kcal/g, recommend to increase the energy density of the meal (adding special foods) or increase the amount of food per meal. Find out what the energy content of complementary foods is in your setting and adapt the table accordingly.

Annexure 3

Enhancing Iron Content of Food at Different Ages

Age	**Iron requirement** (mg/day)[1] (ICMR RDA)	**Iron content** (Assuming frequency of meals/day as advised in column 4 above)	**Food-iron content gap** (mg/day)	**Amount of raw green leafy vegetables** (to be cooked and added to food) (g/day)[2]
6–8 months	5	1.0–2.0 mg	3–4	25
9–11 months	5	2.0–2.5 mg	2.5–3.0	25
12–23 months	9	2.5–3.5 mg	5.5–6.5	40

[1] Iron requirement is based on 5 per cent bio-availability from cereal-pulse based diets.

[2] Green leafy vegetables like amaranth *(chaulai sag/dantu)*, spinach *(palak)*, turnip leaves *(shalgam ka sag)*, mint leaves *(pudhina)* and small amounts of tamarind *(imli)* added to the diet daily will together provide the amount of iron recommended. These are broad guidelines. Recipes should be adapted based on local customs and availability of specific vegetables.

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