Iron Deficiency Anemia in Pregnancy: Can We eradicate?

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ABSTRACT

Iron deficiency anemia (IDA) is the most common type of anemia. Most of the anemic patients, especially women, suffer from mild to severe deficiency of iron. Almost 50% of all pregnant women experience IDA during their pregnancies, and at least 1 out of 5 of girls and women may experience it during their reproductive years. One complete eradication of IDA is not feasible but a try can help us on a long way. Only supplementation is not the answer. Going to the root cause, finding out current situation and managing accordingly by available resources is the correct answer.

Keywords: Anemia, Eradication, Iron deficiency, Pregnancy.

How to cite this article: Munshi A, Munshi S. Iron Deficiency Anemia in Pregnancy: Can We eradicate? World J Anemia 2017;1(2):36-39.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Iron deficiency anemia is the most common type of anemia. Most of the anemic patients, especially women, suffer from mild to severe deficiency of iron. The hemoglobin (Hb) count in most adolescent girls in India is less than 12 g/dL. Most IDA-inflicted people include young children, pregnant women, and menstruating girls and women. Almost 50% of all pregnant women experience IDA during their pregnancies, and at least one out of five girls and women may experience it during their reproductive years.¹

ANEMIA IN PREGNANCY

Both red blood cell (RBC) mass and plasma volume expand from the 1st trimester of pregnancy. Maternal Hb levels reach a nadir near the end of the 2nd trimester (i.e., diminish by approximately 5 g/L). The plasma expands about 30 to 40% in volume, which exceeds the

20 to 25% increase in RBC mass. Thus, there is a dilutional drop in Hb concentration, which promotes oxygen transport to the tissues including the placenta. Thus, it is no surprise that the physiological iron requirements are three times higher in pregnancy than they are in menstruating women, with increasing demand as pregnancy advances.²

About 1000 mg of iron is required during pregnancy, out of which 500 to 600 mg is required for RBC expansion, 300 mg for fetus and placenta, and the rest is utilized for the growing uterus. The prevalence of amenorrhea during pregnancy saves about 150 mg of iron, and therefore, about 850 mg of extra iron is required. Even then, about 500 mg of iron gets depleted, which cannot be replenished through diet alone. If iron stores are already deficient, then IDA, the most common type of anemia in pregnancy, manifests.³ Figure 1 shows the reasons of anemia and Table 1 shows the impact of anemia on mother and fetus.

Fig. 1: Causes of anemia in pregnancy

Table 1: Impact of anemia on pregnancy outcomes

Moderate anemia		Severe anemia	
Maternal effects	Weakness	Maternal effects	Palpitations and breathlessness
	Fatigue		Tachycardia
	Poor work performance		Cardiac stress
			Increased incidence of preterm labor, preeclampsia, sepsis
		Fetal outcomes	Decreased iron stores
			Small-for-gestational-age
			Increased incidence of perinatal mortality

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Table 2: Problems faced in eradication and how we are failing

Lack of focus on the underlying causes	Poor testing and treatment facilities at hospitals
Lack of focus on prevention	Poor distribution of medicines
Lack of widespread awareness due to illiteracy, poverty etc.)	No proper maternal transfer system across locations
Quality and variety of medicine	Lack of monitoring mechanism

HOW TO ERADICATE ANEMIA?

Identify problems associated with IDA eradication (Table 2).

Timely Detection of Anemia

All women require a complete blood examination (CBE) at the first antenatal visit to determine whether anemia, signs of evolving anemia, or features suggestive of a thalassemic syndrome/hemoglobinopathy are apparent (Fig. 2). Repeat CBE at 28 weeks.²

Prevention is Better than Cure

- Twelve by twelve is an initiative aiming to have Hb of 12 g/dL by 12 years of age using prophylactic iron therapy and advising consumption of iron-rich food.³
- *Deworming*: Oral antihelminthic treatment is safe for pregnant and lactating women. Thus, single albendazole (400 mg) or mebendazole (100 mg) doses twice daily for 3 days with iron supplementation should be given to all anemic pregnant women in the second and third trimesters for better results.³
- Supplying folic acid tablets from the 1st month of pregnancy.
- Adolescents should be educated about anemia and appropriate nutrition.

Nutrition

- The recommended daily intake of iron for the latter half of pregnancy is 30 mg.
- Absorption of iron increases 3-fold by the 3rd trimester, with iron requirements increasing from 1, 2 to 6 mg per day²
- Iron nutritional status depends on long-term iron balance and is favoured by ingestion of adequate amounts of iron in the diet (native or fortified) or through iron supplementation.³
- All women should be counseled regarding²
 - The importance of maintaining adequate iron stores in pregnancy
 - Diet in pregnancy including details of iron-rich food sources
 - Inhibitors and enhancers of iron absorption
- *Dietary diversification*: Pregnant women should consume iron-rich foods, such as jaggery, green leafy vegetables like spinach, mustard leaves, turnip green, cereals, and sprouted pulses and cook their food in iron utensils. Too much of cooking should be avoided.³
- *Food fortification*: Fortification of foods with iron aims at improving and sustaining iron nutrition permanently. Iron fortification of common salt can be carried out and has been approved by the Government of India.³
- Factors affecting iron absorption are mentioned in Table 3.^{1,2}

Table 3: Absorption factors

Enhancers	Inhibitors
Vitamin C	Phytates and other inositol phosphates
Meat, chicken, fish, certain sea foods	Coffee, tea, cocoa, certain spices
Fermented vegetables	Calcium
	Soy proteins

Fig. 2: Progress of Iron deficiency anemia. ID: Iron deficiency; TIBC: Total iron binding capacity

Fig. 3: How much iron at different phases

Fig. 4: Indications and contraindication of parenteral iron

Supplementation

- Dietary changes alone are insufficient to correct IDA and iron supplements are necessary.²
- Figure 3 shows the iron supplementation at different phases
- As most women start their pregnancy with anemia or low iron stores, prevention should start even before pregnancy. As a public health approach, prolonged oral supplementation beginning before the woman becomes pregnant may be a better strategy to benefit the majority of the population.³
- Iron supplementation to the mother during pregnancy improves perinatal outcomes, such as the baby's weight, and Hb level 3 months after birth.³
 - Oral supplementation
- Dose: 150 mg of elemental iron (750 mg iron salt)
- Oral iron supplements are absorbed better on an empty stomach and are given in divided doses.
- However, oral iron supplements exhibit side effects, such as heartburns, nausea, upper gastrointestinal disturbances, constipation, diarrhea, and teeth stains.
- Parenteral supplementation
 - Blood transfusion with packed cell volume components is carried out only in emergency situations to correct severe anemia. It can restore

the Hb levels rapidly within 48 hours. However, precautionary measures need to be taken in order to reduce the risk of transmission of infections, transfusion reactions (Fig. 4).

CONCLUSION

Complete eradication of IDA is not feasible but a try can help us a long way. Only supplementation is not the answer. Going to the root cause, finding out current situation and managing accordingly by available resources is the correct answer.

The World Health Organization has recognized IDA in the general population as the most debilitating nutritional deficiency worldwide, noting women to be at particularly high risk. Such a problem, if ignored and not addressed properly, can have a devastating effect on entire populations with serious consequences. The developing world is most vulnerable to IDA. Awareness of the magnitude of the IDA during pregnancy and in nonpregnant females will help health practitioners in recognizing the best methods for diagnosis and treatment, in order to overcome IDA.⁵ The practitioners must focus on building iron stores, increasing patient compatibility of the treatment, prophylaxis of IDA, and utilizing the resources of oral iron, IV iron, and erythropoietin injection resourcefully.

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