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EDITORIAL

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Iron deficiency anaemia is a major public health problem in India with women in the reproductive age group bearing the brunt. Repeated pregnancies and child births further aggravate the situation. Iron deficiency takes a heavy toll on women's health and manifests itself in easy fatigability and decreased work capacity.

In India, anaemia is widely prevalent among children, too. According to the National Family Health Survey-3 report about 70% of children in the age group 6-59 months were anaemic, among them, 26% were mildly anaemic (haemoglobin 10.0-10.9 g/dl), 40% were moderately anaemic (Hb 7.0-9.9 g/dl), and 3% were severely anaemic (Hb< 7.0 g/dl). Anaemia increased slightly from age 6-8 months to age 12-17 months and declined steadily at older ages. The prevalence of anaemia did not vary with the sex of the child. Anaemia was considerably higher in rural areas than in urban areas. Similarly, children of women with no education, disadvantaged groups (particularly scheduled tribes), and children from households in the lower wealth quintiles, too, showed higher incidence of anaemia. In the case of women, more than half (55%) had anaemia. This comprised 39% with mild anaemia (Hb 10.0-11.9 g/dl), 15% with moderate anaemia (Hb 7.0-9.9 g/dl) and 2% with severe anaemia (Hb< 7.0 g/dl).

Anaemia was pervasive among women in the age group 15-49 years. However, fewer women were anaemic in households in the highest wealth quintile. Similarly, anaemia was less prevalent among women with 10 or more years of education, Jain and Sikh women. If marital status is considered, anaemia was lowest for women who had never been married and highest for women who were widowed, divorced, separated, or deserted. The prevalence of anaemia was similar throughout the age range. Anaemia tended to increase with the number of children born and decrease with education and the household’s wealth. Anaemia was more prevalent among women who were breast feeding (63%) and women who were pregnant (59%) than among other women (53%). The prevalence of anaemia was also high among rural women, women from scheduled tribes, women who smoked, and women belonging to ‘other religions’. (1)

The National Nutrition Anaemia Prophylaxis Programme was launched in 1970 to prevent nutritional anemia in mothers and children. Under this programme, the expectant and nursing mothers as well as acceptors of family planning were given one tablet of iron and
folic acid containing 60 mg elemental iron which was subsequently raised to 100 mg elemental iron. However, folic acid content remained the same (0.5 mg of folic acid).

Children in the age group of 1-5 years were given one tablet of iron containing 20 mg elemental iron (60 mg of ferrous sulphate and 0.1 mg of folic acid) daily for a period of 100 days. This programme was taken up by Maternal and Child Health Division of the Ministry of Health and Family Welfare. Now it is part of the Reproductive Child Health (RCH) programme of the National Rural Health Mission.

Under the RCH programme, the policy has been revised to manage the widespread prevalence of anaemia in the country. Infants from the age of 6 months onwards up to the age of five years shall receive iron supplements in liquid formulation in doses of 20 mg of elemental iron and 100 mcg of folic acid per day per child for 100 days in a year. Children in the age group of 6-10 years shall receive iron in the dosage of 30 mg elemental iron and 250 mcg of folic acid for 100 days in a year and children above this age group would receive iron supplements in the adult dose.

For supplementation programmes to be effective deworming needs to be included. School, village and anganwadi health days could offer deworming, vitamin A supplementation and immunization.

Some of the constraints leading to inefficacy of the nutrition programmes have been outlined by Vijayaraghavan. He cites these to be lack of coordination, shortage of resources and manpower, inadequate and irregular supplies, lack of proper orientation and training to the functionaries, poor monitoring and supervision and absence of nutrition education. He has further suggested some integrated and multi-sectoral approaches to achieve the goals. These approaches include community friendly nutrition education to increase awareness and motivation, active people's participation, food fortification, nutrient supplementation, nutrient oriented horticulture programmes, orientation of functionaries and establishment of integrated micronutrient surveillance.

The cost of intervention with iron has been assessed by Gopaldas who has evaluated the mid-day meal project in Gujarat. Almost 3 million primary school children in Gujarat have been receiving daily free lunches, supplements of iron, iodine and vitamin A and deworming treatment with Albendazole. The annual cost per child of albendazole, iron and vitamin A and iiodized salt was approximately US $ 0.50 while the midday meal cost was approximately US $ 20/child/year. The cost of providing iron supplementation through the primary health care system in India has also been worked out. The cost per beneficiary for adult folifer was Rs. 3.60, for paediatric folifer was Rs. 2.90 and for syrup folifer, was Rs. 15.50. The overall cost of providing iron and folic acid supplements to the "at risk" population was estimated at Rs. 4.40 per beneficiary per year. Hence, iron supplementation through the Primary Health Centre system was perceived to be a low cost intervention.

The symptoms seen commonly amongst anaemic women are skin pallor, pale nails, pale conjunctiva, and spoon shaped nails in advanced cases. Clinically, anaemic women have low circulating haemoglobin, thus decreasing the oxygen-carrying capacity of blood. Consequently women get tired easily and have decreased work output. Such symptoms are not given due consideration, thereby compounding the problem.

Kapil and Bhavna have summarised some of the important adverse effects of iron deficiency as decreased physical work performance, mental and psychomotor functions,
growth, immune response and temperature regulation. They further write that minimal work capacity, work output and endurance are also impaired by iron deficiency which is proportional to the severity of anaemia. Aerobic capacity in anaemic children is reduced and anaerobic metabolism has an effect on the stress of exercise, resulting in early fatigue. Children with anaemia or even mild iron deficiency show poor attentiveness, memory and academic performance in the areas of vocabulary, reading and knowledge. Subsequently, children with iron deficiency fail to perform well in standardized scholastic tests and have impaired motor development. Weights of children with iron deficiency anaemia are below normal at the time of diagnosis. Morbidity from infectious diseases is also increased in an iron deficient population. Iron deficient anaemic subjects more readily become hypothermic and have depressed thyroid function.

The diets of Indian women contain low amounts of iron. There are very few foods which are good sources of iron. Traditional Indian diets contain a number of inhibitors like phytates, oxalates and tannins which are prevalent in grains, legumes, green leafy vegetables, tea and coffee resulting in poor absorption of iron. Indian diets are also predominantly vegetarian and contain very little of haeme iron. The absorption of non-haeme iron is very low. However, it can be enhanced by the presence of vitamin C. Hence, the major dietary factors responsible for iron deficiency anaemia are reduced intake and poor bioavailability of iron.

The best strategy to combat anaemia is the dietary approach. The consumption of foods rich in iron such as pulses, dark green leafy vegetables and animal products with an adequate intake of protein and vitamin C in the diet can help to ameliorate the condition of anaemia. However, due to the presence of anti-nutritional factors in diet, the absorption of iron from habitual Indian vegetarian diets is very poor. Absence of animal foods from the diet further aggravates the situation.

Nutrition education is the key to bringing about appropriate changes in the dietary habits of women. Integrated Child Development Services functionaries can help provide this information to the women and influence them to bring about a change in dietary habits. This is, however, likely to be a difficult proposition. Lack of purchasing power and low availability of the right kinds of foods further distort the scenario.

Synthetic sources of minerals and vitamins aid in mitigating nutritional deficiencies. Iron is given in the form of ferrous sulphate, ferrous fumarate and ferrous gluconate. These salts are easily absorbable and are given in combination with folic acid along with vitamin C. Elemental iron sources have certain side effects resulting either in diarrhoea or constipation which the illiterate women find difficult to handle. Moreover, the stools are coloured black.

Many pregnant women believe that the skin colour of their unborn child will also become dark if they consume iron tablets. Such taboos restrict women from consuming these tablets and they remain anaemic throughout their life.

Supplementation of foods by natural and synthetic sources has been used as a strategy to combat anaemia. Supplementation of foods by iron rich food sources like dried dark green leafy vegetables has been attempted. Products like papads, biscuits, namkeens, extruded products, chapaties, vegetables etc. have been used as a vehicle for supplementation with iron rich sources. Synthetic sources of iron have also been used to supplement food products.
Fortification of salts, sugar and wheat flour with iron has been proposed. Although the fortification of such commonly used food items was tried in small pilot projects, it failed to make a national impact. Private companies have fortified biscuits, breads, rice, tea leaves etc. with iron but not at a large scale and such products do not reach the women who need iron the most.

In India and several other developing countries, salt has been considered to be the most appropriate universal vehicle to carry nutrients to cover the entire population, particularly the poor population groups among whom nutrient deficiencies are most widespread. Iodisation of salt is already in operation in many states of India. Double fortification of salt with iron and iodine has also been field tested at National Institute of Nutrition, Hyderabad, but it is yet to be implemented at the national level.

Supplementary foods meant for the vulnerable groups can be fortified with extra nutrients. Such foods can be fortified with other nutrient rich foods, such as red palm oil, leaf powder, or leaf protein concentrate, which are rich in beta-carotene, and other nutrients. The supplementary foods that are currently used for children and mothers are intended to provide extra energy and protein. These supplements can further be fortified with calcium and other micronutrients such as iron, zinc, vitamin A, riboflavin, ascorbic acid, and folate to improve the intake of these nutrients by the vulnerable groups. Supplementation of iron, elemental or from food sources alone and in combination with other nutrients has helped ameliorate the nutritional status of different population groups. The beneficial effects have been seen in the mitigation of the prevalence of iron deficiency anaemia, improvement in weight, height, growth, appetite and in haemoglobin and ferritin levels especially in anaemic population. Use of anthelmintics prior to administration of iron sources has resulted in a drop in intestinal parasite prevalence and better results in anaemic status. Food products like biscuits, shakarparas, mid-day meal, beverages, premixes, lunch meal, kichadi, etc., have been used as a vehicle to carry iron and other nutrients.

Anaemia in young children is a serious concern because it can result in impaired cognitive performance, language development and scholastic achievement. Supplementation with iron has resulted in significantly improved scores in cognitive functions. Sen and Kanani from their study on adolescent girls had pointed out that in daily and twice weekly iron folic acid groups, positive change in cognition test was relatively higher in girls with good compliance vs poor compliance, in anaemic vs non-anaemic girls and in those with higher haemoglobin gain vs lower haemoglobin gain.

Iron and iron energy supplementation has been seen to improve the physical work capacity and anaemic status of adolescent girls and women. In case of women tea pickers from Balanoor Plantations, the average amount of tea per picker and the number of "moderate pickers" had risen significantly on iron supplementation. Moreover, common health problems had also decreased.

Daily, weekly and biweekly administration of iron has also been debated. Although weekly and biweekly administration of iron was effective in raising haemoglobin levels and in decreasing community prevalence of anaemia, daily iron supplementation gave better results. Moreover, weekly and biweekly administration of iron took longer to raise haemoglobin levels. Furthermore, iron supplementation with folic acid was considered more effective and addition of vitamin C to iron-folic acid supplementation was even more superior.
Double fortified salt with iodine and iron and salt fortified with iron and other micronutrients have been used as a vehicle for iron supplementation. Supplementation with fortified salt has resulted in improvement in haemoglobin levels and decrease in prevalence of anaemia.\(^{(13-15)}\)

Hence, supplementation with iron has played an important role in combating iron deficiency and improving anaemic status of women, adolescents and children. Iron supplementation has also resulted in improved growth, cognitive functions and physical work capacity. Therefore, it is essential to underscore the need to supplement the diets of women, adolescents and children with iron, folic acid and vitamin C as iron deficiency anaemia is highly prevalent in India.

REFERENCES

