

Current Issues for the Prevention of Iron Deficiency Anemia Amongst Young Children

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Iron deficiency remains a major nutritional problem among infants and young children in India and is a leading cause of morbidity and mortality worldwide (1,2). The National Family Health survey II, conducted in 1998-99, documented that about 74 percent children between the ages of 6-35 months were anemic (3). Numerous studies have demonstrated that even moderate anemia (hemoglobin < 10gm/dl) is associated with depressed mental and motor development in children that may not be reversible (4). Thus, primary prevention of anemia and iron deficiency should be the goal of nutritional intervention programs. The continuation of limited iron stores at birth, timing of umbilical cord clamping, timing and type of supplementary food introduction, and frequency of infections account for high prevalence of iron deficiency in India. Human milk contains very little iron (about 0.3mg/l), thus iron stores in the exclusively breastfed infant will quickly be depleted so that by six months of age most storage iron is used up.

Since 1990, outstanding progress has been made towards eliminating iodine deficiency through universal salt iodization. However, during this same period, little progress has been made towards elimination of iron deficiency. Iron continues to remain the most neglected micronutrient in spite of its greater burden on health (5). There are three possible interventions for the prevention of anemia. These include dietary diversification, food fortification and individual supplementation (6). Dietary diversification involves promotion of a diet with a wider variety of iron containing food. The fortification of staple

foods such as wheat or other grains is likely to increase iron intake to those population that have access to them (7). However, infants and children who have a limited capacity to eat large quantities of fortified food are not likely to get benefit significantly from this strategy. The final approach is through supplementation of individuals or communities at risk. It is true that National Nutrition Anemia Control Program (NACP) was launched in the country in 1970. It was supposed to cater to children between 1-5 year of age. Under this program, 50% of children were to be given 100 tablets of iron and folic acid (IFA) per year for prophylaxis against nutritional anemia. However, the children below 24 months cannot swallow the tablets and there is no provision of IFA liquid preparation in the program. Consequently the children in this age group largely remained uncovered. (7,8). It is evident that strong concerted efforts need to be undertaken to improve the present scenario. Some of the possibilities in this context are: (i) inclusion of IFA liquid, under the NACP and targeting iron supplementation to children in the age group of 6-35 months on a priority basis (ii) initiating iron supplementation to all anemic and non anemic women / adolescent girls in the community so that they can enter pregnancy with adequate iron stores, (iii) promotion of exclusive breast feeding for all infants as it plays a significant role in preventing iron deficiency in both infants and their mothers, (iv) full term infants (of mothers with adequate iron stores), who are exclusively breastfed do not need supplemental iron until they are 6 months of

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age. After this age breastfed infants should be given extra iron in the form of iron-fortified home made complementary foods.

In 1996, a group of UNICEF consultants suggested the possibility of using a simple and potentially viable new method to provide micro-nutrient supplement (including iron) to populations at risk (6). Responding to the UNICEF directive, the Metabolic Research Group at the Hospital for Sick Children, University of Toronto, developed a supplement containing microencapsulated ferrous fumarate in powder form (plus ascorbic acid) which can be sprinkled on to any complementary food at the table by a caregiver. The supplement is referred to as 'Supplefer Sprinkles'. The iron is encapsulated in a thin coating of soya – based hydrogenated lipid that prevents oxidation reactions and mask its metallic taste. The encapsulation prevents changes in the colour and taste of foods to which the micronutrients are added. To administer the correct amount of iron, the micronutrients are packaged in single-dose sachets (similar to oral rehydration sachets), and the entire contents are then sprinkled onto foods served in the household. One of the advantages of a powder supplement containing micronutrients that are microencapsulated is that other essential micronutrients such as Vitamins A, C and D, folic acid as well as minerals like iodine and zinc can be formulated into the sachet to prevent common deficiencies.

The sprinkles are as efficacious in preventing and treating iron deficiency anemia in infants as the standard iron drops (9). For a population of infants that is generally non-anemic, the Indian RDA is likely adequate. For an anemic populations, however, one must provide enough iron to meet ongoing needs and an additional amount to account for the erythrocyte synthesis necessary to achieve a normal hemoglobin concentration and the replenishment of iron stores. Because microencapsulated iron sprinkles are added to foods

which may be high in inhibitors of iron absorption (such as phytic acid and other fibres), the dose must also account for this negative impact on absorption. The exact dose of iron to include in the supplefer sachets, is likely between 15-45 mg/sachet.

Improving the safety, adherence, sustainability and cost –effectiveness of iron supplementation is a continued goal for researches around the world. The option of using once daily drops or sprinkles, therefore, may improve adherence to treatment and thus the success rate for the prevention and treatment of anemia.

In the future, micro-encapsulated iron sprinkles may be useful strategy for treatment and prevention of iron deficiency in infants because they are simple to use, lack side effects and are as efficacious as drops.

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