Anaemia in Children - A Challenge

Aijaz Ahmad Lone, Shakir Ahmad Wani, Zubair Ashai, Fazal Q. Parry

Anaemia in children – A Challenge

Anaemia is the principal nutritional dearth in the world, and it especially affects children and pregnant women in developing countries. Nutritional Anaemia according to the WHO, is a state in which the hemoglobin concentration in the blood is lower than levels considered normal for the age, gender, physiological state and altitude, as a consequence of shortage of essential nutrients, independent of the cause of this deficiency (4, 9, 10). Nutritional anaemia includes lack of nutrients such as iron, folic acid, vitamin B, and copper, vitamin C and E and vitamin A (11).

The occurrence of anaemia due to iron deficiency is labeled as iron deficiency anaemia. This deficiency is the most common nutritional disorder in infancy, and it affects communities not only in developing nations but also in highly industrialized countries (2, 3). Iron deficiency anaemia also affects women of child bearing age (4).

Etiology

The main factors involved in the etiology of anaemia in children are the iron reserves at birth, growth rate, diet and iron loss (8). Organic physiological loss of iron occurs in bile, urine and cellular desquamation of the skin and intestinal lining. In children, loss also occurs due to blood in the feces and by the use of whole milk in liquid form during the first year of life (4, 5, 11). Another possible cause of iron loss is the presence of intestinal parasites, although several studies have shown that the majority of parasitic diseases have secondary importance in the etiology of iron deficiency anaemia in under 5-year olds (4, 5, 9, 10).

The most significant weight gain and storage of iron by the fetus occurs during the last trimester of pregnancy. Premature births, intrauterine growth restriction and multiple pregnancies are factors that lead to iron deficiency anaemia within the first six months of life, caused by low stocks of iron at birth (4, 8). The average iron concentration per kilogram of body weight at birth is 70mg/Kg for full-term infants (6, 8). The average daily iron needs are from 0.72mg to 0.46mg for children from five months to one year old and from one to three years old, respectively (7).

In the diet, the quantity of bioavailable iron is important, and this is determined by stimulation and inhibitory factors that exist within a meal (7). Among the iron absorption stimulation factors in the diet are organics acids, which is found in citric fruits (9). Among the iron absorption inhibitory factors are phytic acids, which is found in fibres, whole grains and beans (10), oxalic acid, which is found in spinach and beetroot (11), and tannin, which is found in tea, coffee and chocolate. Calcium, which is present in milk and dairy products, and other minerals that are close to iron in the periodic table, which compete with the same intestinal absorption (12), also inhibits the absorption of iron.

For full-term newborn babies, the iron deposits at birth provide the needs for this mineral until four to six months of age. Breastfeeding alone acts as a protective factor during the first months of life and, in spite of the low iron content of human milk (0.26 to 0.73mg/L), the mineral in mother’s milk has high bioavailability and absorption (around 50%) (26). Because of the greater physiological requirements within the first two years of life, and specifically from 6 to 12 months because of the accelerated growth during this period, it is rare that the child will manage to ingest the recommended daily amount of iron. This is true even when good sources of bioavailable iron are introduced into the diet. Thus, preventive iron supplements are usually necessary for this age group (7).

Prevalence

According to the United Nations Children’s Fund (UNICEF), 90% of all types of anaemia in the world are due to iron deficiency (4). In South and Central America, iron deficiency anemia has been a severe public health problem, affecting as many as 50% of pregnant women and children (6).

Consequences of iron deficiency in children

Studies show that children with iron deficiency present worse performance in psychomotor tests than do non-anemic children. The greatest prevalence of iron deficiency among breastfed infants coincides with the final period of rapid brain development (six to 24 months), when the motor and cognitive skills take shape. Long-term prospective studies have also identified persistent cognitive deficiencies in 10-year-old children who had suffered from anemia during the first month of infancy.

In South Africa, six to eight-year-olds who were observed to have low iron reserves, presented with...
retarded growth in comparison with those who had normal reserves. A boost in the growth of iron-deficient preschool children was seen after supplementation of this mineral. Also, 12 to 18-month-old children with iron deficiency presented the same rate of psychomotor development as did non-anemic children, after four months of treatment with iron supplements.

Iron deficiency can also negatively affect cellular immunity, even before the child becomes anemic, and this can lead to an increase in illnesses such as diarrhoea, respiratory disease and other infections. These effects can be reduced by iron supplementation or good fortification.

**Forms of control**

Despite the efforts by the World Health Organization (WHO), with their disease eradication programmes, most of the world still faces difficulties in eliminating public health problems. In Brazil, the 8th National Health Conference, which took place in 1987, accepted the health depends, among other things, on the state of the diet, housing, environment, salary, transport, leisure, liberty and access to healthcare services. This stance diverts attention from the disease as presented to the doctor, and leads to consideration of the human being as a whole and his living conditions. Thus, the emphasis in the debate on health is redirected from the purely biomedical and curative viewpoint to a broader, preventive new involving social and educational aspects.

Additionally, the debate on health as a basic human right has been reopened. To this, a special emphasis on children’s rights to health should be added, because of their immaturity and consequent incapacity for self-determination and defense, and emphasis on the responsibility of governments to guarantee and protect this right.

For breastfed babies and young infants between 6 and 24 months old, iron supplementation is the main form of treatment for iron-deficiency anaemia (with a prevalence of at least 20%) 9. Other actions carry the implication of mid-term and long-term interventions, to be developed by health organizations, such as the fortification of cheap and easily available foods and the diversification of foods promoted by education programmes 10. Such strategies need implementation urgently, especially for the six to 24-month age group.

Supplementation with ferrous sulfate, either intermittently or weekly, is one short-term strategy that can be applied in wide-reaching programmes, since it presents two advantages: diminishing the side-effects from ferrous salt ingestion and reducing the costs of daily utilization of the mineral. Food fortification should be utilized as a prophylactic measure, choosing specific foods regularly consumed by the population. Domestic drinking water has also been used for fortification purposes, giving good results in children.

Dietary guidance is a strategy that should be simultaneously implemented with some other type of programme, with the aim of improving the bioavailability of iron. In infants under 24 months of age, higher intake of iron originating from plants is observed, but this iron has lower bioavailability. Therefore, to improve iron absorption, meat ingestion should be encouraged because it is rich in bioavailable iron, and/or vitamin C should be included when the diet offers low bioavailable iron.

**References**


16) Palupi L, Schultink W, Achadi E, Gross R. Effective community intervention to improve hemoglobin status in preschoolers receiving one-weekly iron supplementation. Am J...
commentary


