

Iron health: where are we and where are we going?

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The possible consequences of anemia increase during gestation, potentially affecting the child's development and decreasing productivity during adult life. Economic losses related to the consequences of anemia cannot be neglected.

It is noteworthy that since the late 1970s, many experts have been concerned about new strategies to combat iron deficiency.

In 1982, the Brazilian government determined that every woman attended in the Pregnancy Care Program would receive iron supplementation. At that time, in addition to iron supplementation, the diagnosis of anemia through the determination of hemoglobin levels using a portable photometer (Hemoglobinometer) at state healthcare clinics was also recommended. Government policies on anemia were established during the following years.

Although incipient and audacious, the Brazilian commitment to reduce anemia by 1/3 during the following decade launched a number of interventional studies to control iron deficiency in risk groups. Affecting around 50% of under five-year-old children and 30% of pregnant women, the Ministry of Health,⁽¹⁾ in 2005, considered iron-deficiency anemia to be a serious public health problem. During that year, the Brazilian Government decided on a more drastic intervention by establishing the National Iron Supplementation Program (Programa Nacional de Suplementação de Ferro, PNSF) by Ordinance N° 730 of May 13 2005. In this program, the correct amount of iron supplementation was established, especially for pregnant women and children. The program was daring, aggressive and proposed new guidelines to prevent iron-deficiency anemia by adopting national supplementation as shown below.

A number of attempts were made by the Brazilian Ministry of Health to implant this program however, it was not successful due to the low acceptance of ferrous sulfate by pregnant women because of the severity of side effects and the low interest of health professionals for the program.⁽²⁾

In an attempt to improve the current scenario of anemia worldwide, the World Health Organization (WHO)⁽³⁾ recommends the prescription of ferrous sulfate tablets (30 mg-60 mg/day) to pregnant women. However, the WHO determines that countries should tailor the appropriate dosage of ferrous sulfate to their needs.

Currently, we are not sure about the ideal dosage. Over the years, many studies have been carried out but, regrettably, the results are not conclusive.

In 2007, a meeting was held between the Political Coordination on Food and Nutrition of the Pharmaceutical Assistance Department of the Ministry of Health,⁽⁴⁾ and the Institute of Pharmaceutical Technology (Farmanguinhos, Fiocruz) to discuss the production and distribution of iron supplementation in the national program. This time, there was concern related to the supply chain of the program. Difficulties related to the access of municipalities and the problems associated to the distribution of ferrous sulfate have also affected the effectiveness of the program. The difficulties to input data on the national program database, the lack of interest of the healthcare professionals involved and doubts concerning the scientific basis of preventive supplementation (especially regarding the efficacy/effectiveness of supplementation) were issues thoroughly examined.

Another issue raised during this meeting was the difficulty to get critical information from the Ministry of Health, such as the scientific evidence that supports the new protocol proposed by the national program. In order to adopt the administration scheme of 60 mg of iron daily (which is proposed as the most appropriate for pregnant women), other aspects should be taken into consideration, for example, the provision of ingredients and the capacity of national production.

Since 2008, we have seen an increase in publications in the field, which demonstrate a concern about the metabolic aspects of iron absorption and consequences in gestation.

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Table 1 - Iron supplementation program in Brazil

Population	Dosage	Frequency	Treatment period
Children	25 mg of ferrous sulfate	once a week	from 6 to 18 months
Pregnant women	60 mg of ferrous sulfate and 5 mg of folic acid	daily	from the 20 th week until the end of gestation
Women after pregnancy	60 mg of ferrous sulfate	daily	until the 3 rd month after childbirth or miscarriage

Source: Brazil. Ministry of Health⁽¹⁾

Grotto⁽⁵⁾ concluded that the mechanism of iron uptake by the mitochondria is not yet clear. Which transporter is responsible for heme release from the mitochondria is also questioned. It is not clear whether prophylactic iron supplementation is needed, what is the appropriate moment to introduce it and the suitable titration schedule, particularly in the gestational period. Once anemia is diagnosed, it is still unknown which are the most efficient schemes of treatment, as a number of biological groups may respond adversely.

Studies have shown that, due to incongruity in relation to the parameters used in the clinical practice and in epidemiology studies, further population based studies are necessary.⁽²⁾

Using cutting-edge technology to evaluate fetal conditions, researchers raised the hypothesis that, with the decrease in maternal hemoglobin levels, the amount of oxygen transported through the placenta may be below basal concentrations, thus causing disastrous consequences for the fetus.^(6,7) We believe that further research is essential in order to provide consolidated data about the Brazilian reality regarding ferrous sulfate supplementation and we regret the lack of cooperative studies.

We therefore suggest further studies should be undertaken by groups of experts from different biomedical sciences with a single goal: to understand the iron metabolism of the human body and to define the best method to prevent and treat anemia in pregnant women and children. This may lead to safe, effective and feasible actions of the Ministry of Health at the national level.

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