Iron and Folic Acid Supplementation in Pregnancy and Autism Spectrum Disorder

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The Fact => Iron & Folate supplementation is standard in prenatal care:

- Physicians should recommend folic acid supplementation to all women before conception, to reduce the risk of neural tube defects.

- Evidence supports the effectiveness of routine iron supplementation during pregnancy for improving maternal hematological indexes.

- Screening and treatment for iron deficiency anemia can reduce the risks of preterm labor, intrauterine growth retardation, and perinatal depression.
Inappropriate diet/nutrition in pregnancy can lead to numerous deficiencies including iron deficiency and may impair placental function and play a role in miscarriage, intrauterine growth restriction, preterm delivery, and preeclampsia.
Summary of current WHO recommendations for the prevention, control and treatment of anaemia in women

- Daily oral iron and folic acid supplementation is recommended as part of antenatal care, to reduce the risk of low birth weight, maternal anaemia and iron deficiency.

- In addition to iron and folic acid, supplements may be formulated to include other vitamins and minerals, according to the United Nations Multiple Micronutrient Preparation (UNIMAP), to overcome other possible maternal micronutrient deficiencies.
Summary of current WHO recommendations for the prevention, control and treatment of anaemia in women

* In areas where the prevalence of anaemia among pregnant women is lower than 20%, intermittent iron and folic acid supplementation in non-anaemic, pregnant women is advised, to prevent anaemia and to improve pregnancy outcomes.

  • In the postpartum period, iron supplementation, either alone or in combination with folic acid, for at least 3 months, may reduce the risk of anaemia by improving the iron status of the mother.

  • Fortification of wheat and maize flours with iron, folic acid and other micronutrients is advised in settings where these foods are major staples.
Folic Acid

* Folate is essential for nucleic acid synthesis, red blood cell synthesis and maintenance, and fetal and placental growth.

* Maternal folic acid deficiency can cause neural tube defects (NTDs) in the fetus, and other congenital anomalies.
Iron

* Iron is an essential micronutrient, as it is required for an adequate erythropoietic function, oxidative metabolism and cellular immune response.

* Although the absorption of dietary iron (1-2 mg/d) is regulated tightly, it is just balanced with losses. Therefore, internal turnover of iron is essential to meet the requirements for erythropoiesis (20-30 mg/d).
women, however, fail to meet their prenatal nutrient requirements through diet alone and are therefore advised to consume nutrient supplements.
Iron Supplementation reduces the risk of maternal anaemia and iron deficiency in pregnancy but the positive effect on other maternal and infant outcomes is less clear.

Implementation of iron supplementation recommendations may produce heterogeneous results depending on the populations' background risk for low birthweight and anaemia, as well as the level of adherence to the intervention.
Prenatal MM supplementation improved intrauterine growth and can be **recommended** instead of prenatal IFA supplements in settings where micronutrient deficiencies are common.
**Effects of prenatal and/or postnatal supplementation with iron, PUFA or folic acid on neurodevelopment: update.**

* Large, high-quality RCT to assess the effects of supplementation with iron, folic acid are still needed to further clarify the effects of these, and other nutrients, on neurodevelopment
CONCLUSIONS:

* There is no evidence to suggest a different effect on intellectual development between prenatal iron plus folic acid, multimicronutrient supplementation, and prenatal folic acid supplementation in children aged 7-10 y
The plausibility of maternal toxicant exposure and nutritional status as contributing factors to the risk of autism spectrum disorders.

However, more research is needed to demonstrate a causal role of fetal micronutrient deficiencies and clarify the underlying mechanisms that contribute to ASD.
Autism is a neurodevelopmental disorder characterized by impaired social interaction, verbal and non-verbal communication, and restricted and repetitive behavior.

Autism is usually diagnosed in early childhood.

The main signs and symptoms of autism involve communication, social interactions and repetitive behaviors.

Children with autism might have problems talking with you, or they might not look you in the eye when you talk to them. They may spend a lot of time putting things in order before they can pay attention, or they may say the same sentence again and again to calm themselves down. They often seem to be in their "own world." because people with autism can have very different features or symptoms autism as a "spectrum" disorder.
cause of autism is not known. Autism lasts throughout a person's lifetime. There is no cure, but treatment can help. Treatments include behavior and communication therapies and medicines to control symptoms. Starting treatment as early as possible is important.
Autism Spectrum Disorder

* Causes: combination of autism risk genes and environmental factors influencing early brain development

* Prenatal risk factors include maternal gestational diabetes, maternal and paternal age over 30, bleeding after first trimester, use of prescription medication (e.g. valproate) during pregnancy, and meconium in the amniotic fluid. While research is not conclusive on the relation of these factors to autism, each of these factors has been identified more frequently in autistic children compared to their non-autistic siblings and other normally developing youth.
A woman can reduce her risk of having a child with autism by taking prenatal vitamins containing folic acid and/or eating a diet rich in folic acid (at least 600 mcg a day) during the months before and after conception.
CONCLUSION:

- We did not find any evidence to corroborate previous reports of a reduced risk for autism spectrum disorders in offspring of women using folic acid supplements in early pregnancy.
CONCLUSIONS:

- If it is true that too little folic acid results in nervous tissue damage, as is accepted by the scientific community in regard to neural tube defects (NTDs). That too much folic acid may result in nervous tissue damage associated with autism. Although the correlations described here do not provide proof of causation, these data provide an impetus for further study.

- Children who develop autism may be receiving a massive dose of folic acid in utero, as well as, after birth. It would be of interest to carry out a case-control study using medical record data to document folic acid intake for pregnant women whose offspring were later diagnosed with autism and controls.
CONCLUSIONS AND RELEVANCE:

* Use of prenatal folic acid supplements around the time of conception was associated with a lower risk of autistic disorder in the MoBa cohort. Although these findings cannot establish causality, they do support prenatal folic acid supplementation.
Recent research suggests the maternal environment may be especially important for the risk of developing autism spectrum disorders (ASD). In particular maternal infections, micronutrient deficiencies, obesity, and toxicant exposures are likely to interact with genetic risk factors to disrupt fetal brain development.

- Prenatal micronutrient intake are important modifiable risk factors for ASD. Results Zinc, copper, iron, and vitamin B9 are identified as specific micronutrients with relevance to the etiology of ASD.
- However, more research is needed to demonstrate a causal role of fetal micronutrient deficiencies and clarify the underlying mechanisms that contribute to ASD.
• Recommends 0.4 mg/day of folic acid from diet or supplements for all women capable of becoming pregnant to reduce the risk for NTDs.

• Women with a previous pregnancy affected by an NTD should take 4 mg of folic acid beginning 1 month before conception and throughout the first trimester. The United States began mandatory

• Fortification of cereal and grain products with folic acid in 1998.
Universal prenatal daily iron-folic acid supplements are recommended to reduce the risk of maternal anemia, iron deficiency and NTD during pregnancy.

Supplementation of this micronutrients increased demands, leading to potentially adverse effects on the mother and developing fetus. Vitamin and mineral intake more than twice the recommended daily dietary allowance should be avoided.
Thank you for attention