Inescapable Risks of Mandatory Iron Fortification

What is the issue?

Many things have been said about the necessity for mandatory iron fortification of foods in India, but the risks associated with too much iron, particularly in children needs a careful study.

What is the significance of iron in our diet?

- Iron is a mineral that is used to carry oxygen in the hemoglobin of red blood cells throughout the body so cells can produce energy.
- It also helps remove carbon dioxide.
- Babies need iron for brain development and growth.
- Iron deficiency causes anaemia, affects cognitive development and intellectual performance, adverse pregnancy outcomes, etc.
- **Types**- Iron in food exists as two types, heme and non-heme.
- Animal foods such as meat, seafood and poultry provide both types and are better absorbed by the body.
- Non-heme iron is found in plant foods, such as spinach and beans, grains that are enriched, like rice and bread, and some fortified breakfast cereals.
- **The Recommended Dietary Allowance**
    - The RDA for all age groups of men and postmenopausal women is 8 mg/day
    - The RDA for premenopausal women is 18 mg/day
    - The median dietary intake of iron is approximately 16 to 18 mg/day for men and 12 mg/day for women
    - The Tolerable Upper Intake Level for adults is 45 mg/day of iron

As per the NFHS-5 report,the incidence of anaemia has increased from 58.6 to 67% in under-5 children, from 53.1 to 57% in women and from 22.7 to 25% in men. Its economic burden is equivalent to about 4% of GDP.

What efforts have been taken to promote iron fortification?

- Ministry of Health in 2013 launched "**National Iron Plus Initiative**".
- Iron and Folic Acid Supplementation and Deworming for improving the haemoglobin levels were undertaken.
- **National Nutritional Anemia Control Program** aims at decreasing the incidence of anemia by promoting regular consumption of iron rich foods, providing iron and folate tablets and treatment.
- **Anemia Mukt Bharat (AMB)** focuses on reducing anemia amongst pregnant women (from 50% in 2016 to 32% by 2022).
- The **6x6x6 strategy** under AMB implies six age groups, six interventions and six institutional mechanisms in reducing the incidence of anemia.

- The Government of India is on course to adopt a policy on **mandatory fortification of rice** with iron, distributed through programs such as Integrated Child Development Services and mid-day meal schemes.
- The scheme was initiated in 2019-20 and it will run till 2023 and rice will be supplied to the beneficiaries at the rate of Rs 1 per kilogram.

What are the risks associated with it?

- **Risk for non-communicable diseases**- Iron increases the risk for many non-communicable diseases like diabetes, hypertension and even high blood cholesterol.
- As per the National Health and Nutrition Examination Survey, those with high ferritin level had a four-fold higher risk of having diabetes.
- As per the Comprehensive National Nutrition Survey, when an additional 10 mg of iron/day was present, blood sugar prevalence increased by 2-14% across States of India, with similar findings for high blood pressure and high lipids.
- The risk of chronic disease is already very high in our children and the mandatory cereal fortification will contribute to risk magnification.
- Iron causes oxidative stress and increases the cancer risk.
- **Choices removed-** When mandatory fortification is enforced in parts of the population, it removes their choice of foods, or autonomy.
- **Lack of evidence to show its benefit**- Interventions of iron fortification are not being monitored and there is no evidence to show that it has any benefit.
- **Inflation of anaemia prevalence**- The extraordinarily high anaemia figure might be inflated because WHO haemoglobin cut-offs are used to diagnose anaemia in India.
- There is a growing global consensus that these may be too high, and a recent Lancet paper suggested a lower haemoglobin cut-off level to diagnose anaemia in Indian children which will reduce the anaemia burden by two-thirds.
- Haemoglobin level can be low when a capillary blood sample (taken by finger-prick) is used for measurement, instead of the more reliable venous blood sample (taken with a syringe from an arm vein).
- The anaemia burden in India is estimated from capillary blood, and studies have shown that using capillary blood inflates the anaemia burden substantially.
- **Iron- anaemia correlation**- Comprehensive National Nutrition Survey of Indian children showed that iron deficiency was related to less than half the anaemia cases.
- Many other nutrients and adequate protein intake are also important.
- **Indian diet-** The perception that a normal Indian diet cannot meet an individual’s daily iron requirement is wrong thinking, and is based on older iron requirements (as per National Institute of Nutrition 2010).
- The latest corrected iron requirements (NIN 2020) are 30-40% lower
- The iron density of the Indian vegetarian diet is about 9 mg/1000 kCal, which can meet most of the requirements.
- **No behavioural modification-** Food fortification is considered attractive as it requires no behavioural modification by the beneficiary.
- If the iron present in the foods is not well-absorbed, then fortification would be of no use.
- **Economic cost**- The mandatory fortification will cost the public exchequer Rs 2,600 crore annually with poor likelihood of benefit, and posing an unnecessary risk.
- **Complex procedure-** Rice fortification requires a fortified rice grain that exactly matches the shape of the rice it is intended to fortify.
- If it does not match, the instinct of a home cook will be to pick out and discard the odd grains, thereby defeating the purpose of fortification.

What is the answer to this problem?

- Dietary modification strategies should be the preferred solutions.
- We just need to absorb the existing dietary iron better and complement this with all the other nutrients that are required, by eating a diverse diet (with fruits and vegetables).
- With the ever-expanding health care infrastructure, we need to move to equity for all in precision treatment and evaluate the cause of anaemia and prescribe treatment accordingly.
- We should wait for the forthcoming WHO haemoglobin cut-offs to get to the true anaemia burden and only rely on gold-standard venous blood haemoglobin in future surveys.

References

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