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Anemia management through diet

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Nutritional anemia is a worldwide problem with the highest prevalence in developing countries. It is found especially among women of child-bearing age, young children and during pregnancy and lactation. It is estimated to affect nearly two-thirds of pregnant and one-half of non pregnant women in developing countries. According to the World Health Organization (WHO), there are two billion people with anemia in the world and half of the anemia is due to iron deficiency. Anemia is a late indicator of iron deficiency, so it is estimated that the prevalence of iron deficiency is 2.5 times that of anemia. The estimated prevalence of anemia in developing countries is 39% in children <5 years, 48% in children 5–14 years, 42% in women 15–59 years, 30% in men 15–59 years, and 45% in adults >60 years It is a major public health problem in India. Although nearly three quarters of the Indian population live in rural areas, the epidemiology of anemia in rural settings is not well known. According to National Family Health Survey (2005-06), the prevalence of anemia was 70% in children aged 6–59 months, 55% in females aged 15–49 years, and 24% in males aged 15–49 years. Iron deficiency is believed to be the most important cause of anemia among children in India and is attributable to poor nutritional iron intake and low iron bioavailability. Other factors, including folate and vitamin B_{12} and Vitamin A deficiencies, malaria infection, hookworm infestation, and hemoglobin apathies, are also associated with childhood anemia. To our knowledge, no previous report in the published literature has described the relative contribution of these factors to anemia in rural Indian children. To effectively control this problem, health care providers must have a comprehensive understanding of the etiologic factors associated with anemia.

According to WHO adolescent age group is defined as life span between 10-19 years. In India the prevalence of anemia among adolescent girls were 56% and this amounts to an average 64 million girls at any point in time. Studies conducted in different regions of India shown that the prevalence of anemia was 52.5% in Madhya Pradesh, 37% in Gujarat, 41.1% in Karnataka, 85.4% in Maharashtra, 21.5% in Shimla, 56.3% in Uttar Pradesh, 77.33% in Andhra Pradesh, 58.4% in Tamilnadu and in Kerala (19.13% among college students and 96.5% in tribal area). The major risk factors identified from the above studies were socio-economic status, blood loss during menstruation, nutritional status, hand hygiene and worm infestation.

Nutritional needs of girls during adolescent period are generally ignored leading to stunting and poor health. One of the major consequences of the physiological changes and the nutritional neglect which happens during this period is anemia. In a tropical country like India helminthic infestation is very common which can lead to chronic blood loss which in turn results in anemia. Iron-deficiency anemia has remained the top cause of disability in India for 10 years now. The result of poverty, malnutrition, poor sanitation and imbalanced vegetarian diet, widespread anemia has impacted the productivity of India's workforce. The 2005 GBD survey ranked anemia caused by the shortage of mineral iron in the body as the top factor for disability in India. The latest report published last year shows that it caused 10.56 per cent of all Years Lived with Disability (YLDs). According to the World Health Organisation (WHO) Iron-deficiency reduces the work capacity of individuals and entire populations, bringing serious economic consequences and obstacles to national development.

According to study published in the Journal of Nutrition (2002) anemia has led to 17 per cent loss in productivity among workers engaged in heavy physical labour and a 5 per cent dip in the output of moderately active workers, besides causing cognitive deficits up to 4 percent in malnourished children, India loses 0.9 per cent of its gross domestic product (GDP) due to iron-deficiency anemia, according to a paper published in *Food Policy*. This could mean a loss of upto $20.25 billion (Rs. 1.35 lakh crore) World Bank's estimate of India's GDP in 2016. Since it mostly affects women and children, the impact of anemia is best understood by looking at maternal deaths and school dropout rates.

It was the top cause of maternal deaths in India (50 %) and the associate cause in 20 per cent of maternal deaths. Anemia during pregnancy also increases the chances of foetal deaths, abnormalities, pre-term and underweight babies. Last year, India reported anemia among 45 per cent of its pregnant women – the highest in the world – even though there has been a fall of 12 per cent in the last ten years, as India Spend reported in September 2016.

In children, iron deficiency anemia severely affects cognitive performance. It also impacts language skills, motor skills and coordination among infants and young children, and a deficit of five to 10 points in intelligence quotient (IQ). But these effects of iron deficiency in infancy cannot be correct by subsequent iron therapy, according to WHO. Anemia also impacts the immune system and increases chances of infections and inflammatory disease, further affecting individual productivity.

Why are so many Indians anemic? : The leading causes of anemia in India are poverty, caste factors and poor sanitation. But frequent occurrences of malaria and worm infestations too result in high incidence of anemia. A vegetarian diet is also linked with iron-deficiency anemia. Even though a vegetarian diet contains as much dietary iron as a non-vegetarian diet, but animal-based iron is better absorbed (15-40 %) than plant-based iron (1-15 %). To make up for the low absorption, large quantities of green leafy vegetables, pulses and nuts need to be consumed. But these are unaffordable for the poor.

Anemia causes adverse consequences as the disease progress. It not only affects the growth of adolescent girls but also affect their attentiveness, memory and school performance and retention in school and attendance. It also causes delay in onset of menarche, affects immune system leading to infections. If the anemic adolescent girl becomes pregnant, it may increase foetal morbidity and mortality, increase the perinatal risk, increase the incidence of Low Birth Weight (LBW), and overall increase in Infant Mortality Rate (IMR) and Maternal Mortality Rate (MMR). As growing pregnant adolescents compete with the growing foetus for nutrients anemia in pregnancy will be worse than in older women.

Anemia signs and symptoms vary depending on the cause of anemia. They may include Fatigue, Weakness, Pale or yellowish skin, Irregular heartbeats, Shortness of breath, Dizziness or light headedness, Chest pain, Cold hands and feet, Headache. At first anemia can be so mild that it goes unnoticed. But symptoms worsen as anemia worsens.

Prevention of Anemia through diet:

– Food has two types of iron — heme and non-heme iron. Heme iron is found in meat, fish and poultry. It is the form of iron that is most readily absorbed by your body. Iron through these sources absorb upto 30 per cent of the heme iron that you consume. Eating meat generally boosts iron levels far more than eating non-heme iron. Heme iron sources includes Chicken liver, Oysters, Clams, Beef liver, Beef (chuck roast, lean ground beef), Turkey leg, Tuna, Eggs, Shrimp, Leg of lamb etc.

– Non-heme iron is found in plant-based foods such as fruits, vegetables and nuts. Foods with non-heme iron are still an important part of a nutritious, well-balanced diet, but the iron contained in these foods won't be absorbed as completely. Body absorb between two and 10 per cent of the non-heme iron that anyone consume. Its include Raisin bran (enriched), Instant oatmeal, Beans (kidney, lima, Navy), Tofu, Lentils, Molasses, Spinach, Whole wheat bread. Peanut butter, Brown rice etc.

Eating of heme iron with foods higher in non-heme iron, the iron will be more completely absorbed by your body. Foods high in vitamin C – like tomatoes, citrus fruits and red, yellow and orange peppers – can also help with the absorption of non-heme iron.

Body absorbs more iron from meat than it does from other sources. If someone choose to not eat meat, he may need to increase your intake of iron-rich, plant-based foods to absorb the same amount of iron as does someone who eats meat.

Absorption of iron enhanced by drinking citrus juice or eating other foods rich in vitamin C at the same time that you eat high-iron foods. Vitamin C in citrus juices, like orange juice, helps your body to better absorb dietary iron.

Preventing iron deficiency anemia in infants : To prevent iron deficiency anemia in infants, feed your baby breast milk or iron-fortified formula for the first year. Cow's milk isn't a good source of iron for babies and isn't recommended for infants under 1 year. After age 6 months, start feeding your baby iron-fortified cereals or pureed meats at least twice a day to boost iron intake. After one year, be sure children don't drink more than 20 ounces (591 milliliters) of milk a day. Too much milk often takes the place of other foods, including those that are rich in iron.

Preventing iron deficiency anemia in adolescent girls and pregnant women: Iron requirements are greater in pregnancy than in the non-pregnant state. Although iron

requirements are reduced in the first trimester because of the absence of menstruation, they rise steadily thereafter; the total requirement of a 55-kg woman is approximately 1000 mg. Translated into daily needs, the requirement is approximately 0.8 mg Fe in the first trimester, between 4 and 5 mg in the second trimester, and >6 mg in the third trimester. Absorptive behavior changes accordingly: a reduction in iron absorption in the first trimester is followed by a progressive rise in absorption throughout the remainder of pregnancy. If the diet is of intermediate (10 %) bioavailability, only 50 percent of women would be able to maintain a normal iron status and about 20 per cent would develop anemia. Only a very small proportion would be able to build adequate iron reserves for pregnancy. The majority of these women would rapidly develop iron deficiency and gestational anemia during pregnancy. Frequently used forms of iron in supplements include ferrous and ferric iron salts, such as ferrous sulfate, ferrous gluconate, ferric citrate, and ferric sulfate. Because of its higher solubility, ferrous iron in dietary supplements is more bioavailable than ferric iron. Adolescence is an opportunity time for interventions to address anemia. Not only is there need (growth, preparation for pregnancy), but large numbers of both boys and girls can be reached easily if school attendance or participation in other group activities is high. Also, adolescents are open to new information and new practices since they are often striving for physical or academic excellence.

Conclusion : Iron deficiency is associated with poor diet, malabsorptive disorders, and blood loss, people with iron deficiency usually have other nutrient deficiencies. Iron is available in many dietary supplements. Multivitamin/ multimineral supplements with iron, especially those designed for women, typically provide 18 mg iron (100% of the DV). Multivitamin/multimineral supplements for men or seniors frequently contain less or no iron. Iron-only supplements usually deliver more than the DV, with many providing 65 mg iron (360% of the DV). Interventions to prevent and correct iron deficiency anemia therefore must include measures to increase iron intake through food-based approaches, namely dietary diversification and food fortification with iron; iron supplementation and by improved health services and sanitation.

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