Nutritional Anemia in 1 To 5 Years Children with Focus on India

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Abstract

India has the largest number of malnourished children in the world and one third of all the stunted children globally. The low levels of under nutrition, coupled with increasing levels of over nutrition, causing double burden of malnutrition. It is now also emerging that the triple burden of malnutrition is also a reality in India. Given the high rates of economic growth witnessed, the malnutrition levels are a cause of serious concern. It is well recognized that the achievement nutritional security calls for a multi sectoral approach that target the determinants of malnutrition. In this paper, using national representative data from National Family Health Survey (NFHS-4) and existing literature, we review the current nutritional situation in India, its determinants and the policy and programs undertaken to tackle it. Although the rates of malnutrition are reducing, the numbers are still high. There seems adequate number of government programs and schemes that are beneficial, but their full potential is not getting utilized due to various problems. A truly multi sectoral and coordinated approach is required for India to be able to achieve nutrition goals.

Keywords

Nutrition Security; Multisector Approach; Malnutrition; Child Health.

Introduction

The importance of addressing malnutrition in all its form is now well recognized. Malnutrition has long term negative and mostly irreversible effects in early life, including impaired cognitive development, reduced economic productivity, lower attained schooling and an increased risk of chronic disease in adulthood [1]. Recognizing this high importance of nutrition to the development of a nation as well as the world economy, the Sustainable Development Goals (SDGs) of the 2030 Agenda have placed nutrition as one the most central goal, with at least 12 of the 17 SDGs having indicators relevant to nutrition. And yet, despite the strong economic growth in 2018, undernourishment increased for the third year in row [2].

The need to do so is particularly evident in a country like India. Despite recent advances Indian children are still shorter than elsewhere in the developing world at similar levels of economic development . According to the recent Global Hunger Index (GHI) 2017 report , India is ranking 100th out of 119 countries investigated and has the third highest score in Asia. This severe situation is driven to a large extent by high child malnutrition and underlines the need for a stronger commitment to poverty alleviating social policies. As of 2015–2016, more than a fifth (21%) of children in India suffered from wasting (low weight for height) and although there has been progress with respect to stunting (low height for age), down by 20% since 2005, the rate still stands at a staggering 38.4%. Similarly, the underweight rate is down by 16% since 2005, but even that progress leaves India with a relatively high rate of 35.7% [3] .

These elevated rates of childhood malnutrition have large public health implications. Most importantly, widespread undernutrition is strongly correlated and without a doubt causally linked to higher infant mortality [3]. Even if child deaths are not directly due to undernutrition, it has been shown to be the underlying cause for a large number of child deaths from diarrhoea, pneumonia, malaria or measles occurring in the developing world . Undernourished children are more The need to do so is particularly evident in a country like India. Despite recent advances Indian children are still shorter than elsewhere in the developing world at similar levels of economic development . According to the recent Global Hunger Index (GHI) 2017 report , India is ranking 100th out of 119 countries investigated and has the third highest score in Asia. This severe situation is driven to a large extent by high child malnutrition and underlines the need for a stronger commitment to poverty alleviating social policies. As of 2015–2016, more than a fifth (21%) of children in India suffered from wasting (low weight for height) and although there has been progress with respect to stunting (low height for age), down by 20% since 2005, the rate still stands at a staggering 38.4%. Similarly, the underweight rate is down by 16% since 2005, but even that progress leaves India with a relatively high rate of 35.7% [4] . A recent multicountry survey study estimated that severe anaemia during pregnancy was associated with a twofold risk of maternal mortality. However, the consequences of anaemia extend beyond death due to severe anaemia. The intangible cost of anaemia—encompassing a range of sequalae such as motor and mental impairment in children and lower work productivity in adults—has been estimated at 1.3% of gross domestic product for children12 and 4% of gross domestic product for children and adults combined [5]. In India, iron deficiency anaemia is one of the top five leading causes of years of life lost due to disability,5 thus India is paying heavily for failing to address this severe public health problem. Additional direct causes of anaemia include low absorptive capacity of other micronutrients—especially folic acid and vitamin B12—due to intestinal inflammation caused by disease (including obesity) or illness, blood loss and inherited genetic disorders.[14][15]. To accelerate reductions in anaemia, evidence is needed around factors at individual, household and community levels that explain changes in anaemia prevalence over time. Several studies in India have examined cross-sectional associations between anaemia and its ‘determinants’,[16] but very few studies have used multiple rounds of data to model the impact of changes in selected factors on changes in anaemia prevalence over time [20][21]. Given scarce evidence,

policy-makers are challenged to understand which investments will have the greatest impact on future anaemia reduction in India. The traditional approach of iron supplementation and iron fortification of foods[17] may fall short given that only 25% [15] to 50% [14] of anaemia is thought to be due to iron deficiency.

Methods

The Indian Demographic and Health Survey (DHS) 2015–2016 provided data for this analysis. The DHS Program which operates in over 80 low/middle income countries [12]. The DHS used standardized questionnaires to collect information on child health, socioeconomic conditions, household characteristics and other indicators from nationally representative samples of children less than 5 years. The 2015–2016 NFHS used a multistate, stratified cluster sampling procedure which has been described elsewhere [13]. There were a total of 217324 children aged <5 years in the DHS. Trained Indian research assistants administered a pre-tested questionnaire on socio-demographic characteristics and health status of the child from each participating household. Sociodemographic variables assessed included mother's age and religion, level of education and employment of parents, wealth index variables, source of household drinking water and type of toilet facility. Health status indicators included infection status (cough, fever and diarrhea in the last two weeks), immunization, and deworming and vitamin A supplementation in the past 6 months. The first stage involved selection of primary sampling units which were villages in rural areas and Census Enumeration Blocks in urban areas. Within each stratum, villages or Census Enumeration Blocks were selected from the sampling frame with probability of selection being proportional to population size. The second stage involved the random selection of 22 households from each primary sampling unit, where a complete household mapping and listing operation was conducted prior to the main survey. Among the selected households, all women aged 19 to 45 years and children aged 1 to 5 years months were eligible for haemoglobin (Hb) measurement.

Discussion

Nutritional Deficiency Anemia in Children

The term 'nutritional anemia' encompasses all pathological conditions in which the blood hemoglobin concentration drops to an abnormally low level, due to a deficiency in one or several nutrients. The main nutrients involved in the synthesis of hemoglobin are iron, folic acid, and vitamin B12. In public health terms, iron deficiency is by far the first cause of nutritional anemia worldwide. Folic acid deficiency is less widespread and is often observed with iron deficiency. Vitamin B12 deficiency is far rarer. Therefore, the focus in this article is on Iron-deficiency anemia in children. Iron deficiency, and the anemia that results from it, is a major health problem affecting more than 3.5 billion people in developing countries, reducing vitality for the young and old alike, and impairing the cognitive development of children. Anemia is most often a hidden deficiency,

with a few overt symptoms. [6] Policy makers often fail to recognize the massive economic costs, service providers often fail to recognize the significant health consequences, and societies are too often ignorant of anemia's capability to cause permanent cognitive defects, denying children their right to full mental and emotional development, before they ever reach a classroom.

Anemia

An abnormally low hemoglobin level due to pathological condition(s) is defined as anemia. Iron deficiency is one of the most common, but not the only cause of anemia. Other causes of anemia include chronic infections, particularly malaria, hereditary hemoglobinopathies, and folic acid deficiency. It is worth noting that multiple causes of anemia can coexist in an individual or in a population and contribute to the severity of the anemia.

Prevention and management of IDA demands adequate iron intake and provision of bioavailable iron.[8] The most recent estimates reflect an unacceptably low consumption of iron (median: 13.7 mg/day per person) among women in India aged ≥18 years and 51–83% of pregnant women in India are deprived of the recommended daily allowance of iron of 15–18 mg/day.[10] Women in India largely derive iron from non-haem, inorganic sources, including grains, plants, cereals, lentils and vegetables; and, to a small extent, from iron supplements, such as iron or iron and folic acid (IFA) tablets for pregnant women, and iron-fortified foods, as compared to sources of haem iron such as meat and fish, which have a higher rate of absorption.[11] Thus, it is not surprising that India has the highest number of women with anaemia globally, which increases the probability of maternal and child mortality and has significant economic implications for the nation's development.

Iron Deficiency

Iron deficiency (ID) is defined by an abnormal iron biochemistry with or without the presence of anemia. Iron deficiency is usually the result of inadequate bioavailable dietary iron, increased iron requirement during rapid growth, and increased blood loss for any reason. There are no current estimates of the total ID cases, but based on anemia as an indicator, it is estimated that most preschool children in developing counties are iron deficit . The aim of the National Iron+ Initiative was to target IDA across all life stages, thus expanding existing guidance for children, pregnant women and lactating mothers, to include adolescents (both boys and girls aged 10–19 years) and women of reproductive age (15–49 years).[18] With respect to adolescents, the National Iron+ Initiative expanded on the 2012 Weekly Iron and Folic Acid Supplementation programmes for girls in and out of school,[23] to include boys as well.[9] Interventions with women of reproductive age are a recent endeavour under the National Iron+ initiative approved by the Ministry.[21] According to the guideline, the primary intervention to tackle IDA is to administer IFA supplementation with elemental iron and folic acid, [10] WHO has developed guidelines for daily iron supplementation for pregnant women and girls,[17] infants and

children[20] and non-pregnant women and adolescent girls.[21]However, in some cases, iron doses prescribed in the National Iron+ Initiative differ from the WHO recommendation.

Iron-deficiency Anemia

Anemia, when caused by severe iron deficiency is termed as iron-deficiency anemia (IDA). Although, some functional consequences may be observed in individuals who have iron deficiency without anemia. Cognitive impairment, decreased physical capacity, and reduced immunity are commonly associated with iron-deficiency anemia. In severe iron-deficiency anemia, the capacity to maintain body temperature may also be reduced. Severe anemia is also life-threatening. As the most common cause of anemia is iron deficiency, these terms are often used interchangeably. However, it is important to realize that anemia resulting from iron deficiency characterizes a very late stage of iron deficiency. To tackle IDA, India was the first country to launch a National Nutritional Anaemia Prophylaxis Programme in 1970.[14][15] The National Nutrition Policy was launched in 199316 and this formed the basis for the National Plan of Action on Nutrition 1995,[18] which laid out the sectoral Plan of Action to tackle anaemia.[13] In light of the high burden of anaemia in India, one of the goals of the 12th Five Year Plan (2012–2017) of the Government of India was to reduce anaemia in girls and women by 50% – that is to 28% by 2017. [11][12] In 2013, the Ministry of Health and Family Welfare developed an intervention guideline – the National Iron+ Initiative – to mitigate the burden of IDA.[9] On 1 December 2017, the Union Cabinet approved setting up of the National Nutrition Mission under the oversight of the Ministry of Women and Child Development. Among many targets, the National Nutrition Mission aims to reduce anaemia among young children, adolescent girls and women of reproductive age (15–49 years) by one third of NFHS4 levels by 2022.[19]

Conclusion

This study found 50% overall prevalence of anaemia in adolescent girls of 1-5 years. Severity of anaemia is more in 2-4 years of age group in comparison to 1-5 years age group. In our rural setting, most patients attending out-patient clinics had anaemia. The vast majority of anaemia cases were microcytic, suggesting that iron deficiency was the main cause of anaemia. However, the prevalence of normocytic anaemia increased with age, so further studies are needed to clarify the cause of anaemia among 1 to 5 year childrens .

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