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Evaluation of factors responsible anemia in children from Darbhanga medical college and hospital, Bihar

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Abstract
Iron-deficiency anemia can usually be prevented at a low cost, and the benefit/cost ratio of implementing preventive programs is recognized as one of the highest in the realm of public health. This information has equipped everyone in public health to take action against this longstanding problem and to do whatever is needed to be done. Hence the present study was planned to evaluation of factors responsible anemia in childrens referred to Darbhanga Medical College and Hospital.
The present study was planned in the Department of Paediatrics, Darbhanga Medical College and Hospital from Jan 2018 to July 2018.The 200 children's admitted to paediatric department were enrolled in the present study. From that 20 Childs were found anaemic with the age group of not less than 6 months and up to the 12 years of age were considered for the study.
Anaemia is still a major health problem in our country. Childhood anaemia still continues to be a significant public health problem in school children. Hence based on the data generated in the present study and the literature found actions need to be taken to bridge the gap between our desire to control and reduce anemia among children and our lack of action and apathy toward implementing an effective program in anemia control among children. We need to emphasize, train, support, and effectively monitor the program's implementation, and systematically and realistically plan out logistics, supply, monitoring, and implementation of the program at the regional, national, state, and district levels.

Keywords: anemia, school going childrens, factors, bihar region, etc

1. Introduction
Anemia, Iron deficiency and Iron-deficiency anemia are three conditions with minor differences. Abnormally low hemoglobin level due to pathological conditions is defined as anemia. Iron deficiency is one of the most common causes of anemia. Inadequate dietary iron causes iron deficiency. In the case of a girl, increased blood loss can be a cause of anemia. Anemia, when caused by severe deficiency of iron is termed as iron-deficiency anemia. Other causes of anemia are deficiency of folic acid (folate), chronic infections (especially from malaria) and hereditary hemoglobinopathies. Iron is needed by the body to make red blood cells. Improper nutrition significantly decreases the child's ability to learn and remember and the child is unable to perform outdoor physical activities like sports. It also blunts intellectual capacity. This can be solved by changing nutritional attitudes and behaviour of adolescent girls (who would become mothers within few years) [1].
Anemia goes undetected in many people and symptoms can be minor. The symptoms can be related to an underlying cause or the anemia itself. Most commonly, people with anemia report feelings of weakness or fatigue, and sometimes poor concentration. They may also report shortness of breath on exertion. In very severe anemia, the body may compensate for the lack of oxygen-carrying capability of the blood by increasing cardiac output. The patient may have symptoms related to this, such as palpitations, angina (if pre-existing heart disease is present), intermittent claudication of the legs, and symptoms of heart failure. On examination, the signs exhibited may include pallor (pale skin, lining mucosa, conjunctiva and nail beds), but this is not a reliable sign. A blue coloration of the sclera may be noticed in some cases of iron-deficiency anemia [2].
There may be signs of specific causes of anemia, e.g., koilonychia (in iron deficiency), jaundice (when anemia results from abnormal break down of red blood cells — in hemolytic anemia), bone deformities (found in thalassemia major) or leg ulcers (seen in sickle-cell disease). In severe anemia, there may be signs of a hyperdynamic circulation: tachycardia (a fast heart rate), bounding pulse, flow murmurs, and cardiac ventricular hypertrophy (enlargement). There may be signs of heart failure. Pica, the consumption of non-food items such as ice, but also paper, wax, or grass, and even hair or dirt, may be a symptom of iron deficiency, although it occurs often in those who have normal levels of hemoglobin. Chronic anemia may result in behavioral disturbances in children as a direct result of impaired neurological development in infants, and reduced academic performance in children of school age. Restless legs syndrome is more common in those with iron-deficiency anemia [3].
There are a number of definitions of anemia; reviews provide comparison and contrast of them. A strict but broad definition is an absolute decrease in red blood cell mass, however, a broader definition is a lowered ability of the blood to carry oxygen. An operational definition is a decrease in whole-blood hemoglobin concentration of more than 2 standard

deviations below the mean of an age- and sex-matched reference range [4-5].

It is difficult to directly measure RBC mass [6], so the hematocrit (amount of RBCs) or the hemoglobin (Hb) in the blood are often used instead to indirectly estimate the value [7]. Hemotocrit; however, is concentration dependent and is therefore not completely accurate. For example, during pregnancy a woman's RBC mass is normal but because of an increase in blood volume the hemoglobin and hematocrit are diluted and thus decreased. Another example would be bleeding where the RBC mass would decrease but the concentrations of hemoglobin and hematocrit initially remains normal until fluids shift from other areas of the body to the intravascular space.

The anemia is also classified by severity into mild (110 g/L to normal), moderate (80 g/L to 110 g/L), and severe anemia (less than 80 g/L) in adult males and adult non pregnant females. Different values are used in pregnancy and children [8].

Anemia prevalence in young children continues to remain over 70% in most parts of India and Asia despite a policy being in place and a program that has been initiated for a long time. The irreparable damage that anemia in childhood can cause particularly to the development of a young child on one hand and the knowledge and mechanism available for its control on the other, makes this silent morbidity completely unacceptable in modern times where we strive for millennium development Goal. This article reviews in detail the magnitude of child anemia and the mechanism for its occurrence, and deals, in detail, about what needs to be done, what difficulties we face, and how to overcome them, with the primary focus on iron-deficiency anemia (IDA).

Iron-deficiency anemia can usually be prevented at a low cost, and the benefit/cost ratio of implementing preventive programs is recognized as one of the highest in the realm of public health. This information has equipped everyone in public health to take action against this longstanding problem and to do whatever is needed to be done. Hence the present study was planned to evaluation of factors responsible anemia in the childrens referred to Darbhanga Medical College and Hospital.

Methodology

The present study was planned in the Department of Paediatrics, Darbhanga Medical College and Hospital from Jan 2018 to July 2018. The 200 children's admitted to paediatric department were enrolled in the present study. From that 20 Childs were found anaemic with the age group of not less than 6 months and up to the 12 years of age were considered for the study.

Inclusion criteria were to include children between 6 months to 12 years visiting out-patient department and admitted for any illness other than those specified. Only children with hemoglobin of less than 11.00 gm/dl on venous blood were included in the study. Children having acute blood loss, malignancy, bleeding disorder and chronic renal disease or any other chronic illness that directly contributes to anemia were excluded.

All the patients were informed consents. The aim and the objective of the present study were conveyed to them. Approval of the institutional ethical committee was taken prior to conduct of this study.

Results & Discussion

Hemoglobin concentrations are normally higher at birth than at any other time of life, as a result of the adaptation of the fetus to the hypoxic environment of the uterus. In addition, the neonatal reserves of storage iron are relatively generous. Consequently, most newborn infants are well supplied with iron. Between birth and four months of age, there is almost no change in the total body iron in the term infant. The need for exogenous iron is therefore modest during this period. The abundant iron stores present at birth help to provide for synthesis of hemoglobin, myoglobin, and enzyme iron during the first four months. Additional iron from the hemoglobin breakdown is also made available to meet the iron needs because the concentration of hemoglobin declines from a mean of 17.0 g/dl at birth to a low of 11.0 g/dl at two months of age. This low point used to be called the early anemia of infancy, and was distinguished from the 'late anemia of infancy,' because it was unresponsive to iron treatment.

Occurrence of anemia in undernourished children and those belonging to poor socio-economic status is a well documented fact [9-10]. The present study revealed a startlingly high prevalence of anemia among school children of upper and middle socio-economic classes.

Table 1: Demographic Parameters

Variables	No. of Cases
Gender	
Male	63
Female	137
Education of Father	
Illiterate	83
Literate	117
Education of Mother	
Illiterate	98
Literate	102
Economic Class	
Lower	56
Middle	124
Higher	20
Iron Supplement During Pregnancy	

Yes	147
No	53
Anaemic	
Yes	20
No	180

Table 2: Age group and No of Cases

Age	Number of Cases	Positive Cases
6 month to 2 year	19	2
2 to 3 years	27	5
3 to 6 years	35	4
6 to 9 years	40	5
9 to 12 years	79	4
Total	200	20

Table 3: Distribution of Anemia based in Hemoglobin Levels

Age	Number of Anaemic Cases
Below 6 years	
10.0 – 10.9 g/dl (mild)	5
9.0 – 9.9 g/dl (moderate)	3
< 9.0 g/dl (severe)	3
Total Cases	11
Above 6 years	
11.0 – 11.9 g/dl (mild)	4
10.0 – 10.9 g/dl (moderate)	3
< 10.0 g/dl (severe)	2
Total Cases	9

Agravat in 2014 [11] in Rajkot found that continuation of only breastfeeding and no introduction of weaning di*et al*so contributed to anemia. Sahana (2015) [12] found that Improper Weaning techniques, consumption of cow's milk and diluted topup formula feeding is an important cause of anemia. All this highlights the need to educate the mothers and make them aware of proper infant feeding practices.

In a recent study conducted in semi urban Nepal, the prevalence of anemia in adolescent girls aged 11-18 years was found to be about 68.8% [8]. In some of the less developed countries like Peru, Indonesia and Bangladesh, the prevalence of anemia in girls has been found to be around 25-30% [13]. Aggarwal, *et al* [14] in a government school based study from middle socioeconomic group of North East Delhi reported a prevalence of anemia as 45%. Similarly, studies on prevalence of anemia from different states of rural India, reported a prevalence of anemia from 46% to 98% [15-16].

In a study in tribal area of childhood anaemia in Mohana block in Orissa 5yrs to 14yrs by T sahu, N C Sahani[13], L Patnaik showed almost all children (99%) were found to be anaemic, more than 60% of them had moderate to severe anaemia [17]. Verma M. etal in their study on urban school children of age group 5 -15years in Punjab found prevelance of anaemia was 51.5% [18]. Verma A. *et al.* in their study on adolescent girls found mild, moderate, severe anaemia to be 36.6%, 22.4%, 4.8% respectively [19].

Under iron deficiency condition, formation of Hb is reduced resulting in a reduction of mean corpuscular hemoglobin [20]. The transmembrane protein (ferroportin) is responsible for the transfer of iron from enterocytes and monocytes/macrophages to the circulation. It was found that ferroportin mRNA expression was significantly reduced in monocytes of anemic subjects compared with controls [21]. Importantly, the decreased expression of ferroportin was paralleled by increased iron storage in monocytes of anemia of chronic disease patients as estimated by hyperferritinemia. As a functional consequence of decreased ferroportin expression and the subsequent reduction of cellular iron export, intracellular iron levels will increase which interferes in the process of erythropoiesis, thus decreasing expression of monocytes leading to decrease in Hb. In this study, inverse relationship of RDW was seen with the Hb in iron deficiency anemia; however, no such correlation happened with non iron deficiency anemia [22].

The most common reason for iron-deficiency anemia in infants and children is the inadequate supply of iron in the diet. Iron is a mineral the body needs in order to make red blood cells. Children go through periods of rapid growth and the diet should supply enough to facilitate the increased need for more red blood cells. There are other situations when children may acquire this anemia. The infant may have been given low or non-iron fortified formula or breast-fed through the later months without supplementation of iron. This occurs in premature infants or low-birth weight infants. At other times the infant or child may have a gastrointestinal disease such as a chronic infection, chronic diarrhoea, celiac disease or an intestinal parasite. However, the most common factor in infants, children, and adolescents, is the low intake of iron in the diet. Iron-deficiency anemia is common in young children because the child is growing rapidly at a time when the diet is typically low in iron content.

Conclusion

Anaemia is still a major health problem in our country. Childhood anaemia still continues to be a significant public health problem in school children. Hence based on the data generated in the present study and the literature found actions need to be taken to bridge the gap between our desire to control and reduce anemia among children and our lack of action and apathy toward implementing an effective program in anemia control among children. We need to emphasize, train, support, and effectively monitor the program's implementation, and systematically and realistically plan out logistics, supply, monitoring, and implementation of the program at the regional, national, state, and district levels.

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