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Evaluation of Anemia in Hospitalised Infants at a Tertiary Care Hospital

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ABSTRACT

Anemia is a significant public health problem that occurs worldwide in both developed and developing countries. Aim of the present study was to evaluate the pattern of anemia among hospitalized infants. The Prevalence of anemia was 43.6% in the present study with microcytic hypochromic anemia being the major cause (67.4%) suggesting iron deficiency as the major culprit for nutritional anemia seen in infants.

Key words: Infants, Iron Deficiency, Anemia.

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INTRODUCTION

The most important nutritional deficiency (micronutrient deficiency) among children in the present world is iron deficiency.[1] Nutritional anemia is used not only as a health indicator but also, a socio-economic indicator for any nation. The terms anemia, iron deficiency and iron deficiency anemia are used interchangeably.[1] Prevalence of anaemia more than 40 percent in any country is considered as a public health threat as per WHO criteria.[2] The recent report National Family Health Survey-4, 2015-2016 shows, it is still high in India. Anemia prevalence in children is high, especially in developing countries and frequently is multifactorial. During infancy it is due to increased iron requirements related to rapid growth and development and consumption of predominantly cereal based food during weaning which is a poor source of iron. The severity of anemia is associated with premature birth, multiple birth, low birth weight, feeding pattern, maternal anemia during pregnancy.[3] During childhood, several other factors which predispose them to anemia include poor nutritional intake of hematinic (e.g., iron, folate, vitamin A, B- 12 and C, copper), and low bioavailability, impairment of red cell production by acute and subacute inflammation (with an increase in stored iron) and increased red cell destruction either via specific infections (e.g., malaria, hookworm infestation) and hemoglobinopathies.[4-7] Even though the prevalence is high among under five children, majority of the cases goes unnoticed as they are asymptomatic. But if it is not identified and treated at this stage, anemia can negatively affect cognitive development, school performance, physical growth and immunity during their childhood.[8] early diagnosis and appropriate treatment, helps in preventing such problems. Aim of the present study was to evaluate the pattern of anemia among hospitalized infants.

MATERIALS AND METHODS

This present prospective study was carried out in the Department of Pathology, Shantiram Medical College & General Hospital, Nandyal, Kurnool, Andhra Pradesh, during the period from August 2014 to July 2015 after obtaining the ethical clearance from the institution. All the infants between 4 months – 12 months, who were hospitalized in the Department of pediatric Shantiram Medical College & General Hospital, for any other illness but found to have anemia on routine blood investigations (complete hemogram) were included in the study. Except Infants who were known cases of Thalassemia/ bleeding disorders and who had history of blood transfusions.

5 ml of venous blood anti-coagulated with EDTA was collected from the infants and various hematological parameters including hemoglobin, total and differential counts, platelet count, red cell indices like MCV, MCH, MCHC and PCV were estimated.

The WHO Criterion (hemoglobin< 11g/dl) was used to diagnose anemia. The degree of anemia was categorized based on these cut-off points: 10.0 – 10.9 g/dl – mild anemia, 7.0 – 9.9 g/dl – moderate anemia, < 7 g/dl – severe anemia.

RESULTS AND DISCUSSION

A total of 197 infants of age group 4 months – 12 months were admitted during the study period, among which 86 infants were selected who fulfilled the inclusion criteria. Among the study group, there were 31 (36.04%) males and 55 (63.9%) females. The mean age was 9.2 months. Table 2 shows the distribution of study subjects based on the clinical diagnosis. Mean hemoglobin was 8.61±1.23g/dl, the lowest value being 3.02g/dl. Based on WHO classification, 50.04% had Mild anemia,

45.3% had moderate anemia, and 4.6% had severe anemia. Microcytic hypochromic anemia was observed in majority of the cases (67.4%) followed by normocytic normochromic anemia in 30.2% of cases. Dimorphic anemia was seen in only 2.3% of cases.

There are many studies with prevalence of anemia in the community, but there are few studies conducted to explore the prevalence of anemia among the hospitalized children. Out of the 197 infants who were admitted in our hospital during the study period around 86(43.65%) of them were found to be anemic. Saba F et al had conducted a study in children and noted that 33% of children between the age group 6 months to 1 year were affected with anemia.[9] The similar finding was noted in a study by F Akin et al who found that Hemoglobin and packed cell volume of the patients with age group 6 – 12 months were markedly lower when compared to the patients > 24 months age thus making 6 – 12 months age group most vulnerable for the development of anemia.[10] In our study the female infants predominantly suffered from anemia (63.9%), where as in a study done by Dos santhos et al there was no difference noted between the gender with anemia affecting equal number of boys and girls,[11] the reason being that the study was done in two different countries.

Table 1: Distribution of study subjects based on hematological parameters

Parameters	Minimum	Maximum	Mean
MCV	50	112	76
MCH	13.1	40	21.3
MCHC	25.02	47	32.5
RDW	5.2	21.4	11.2
RBC	2.02	5.42	3.21
PCV	12.6	34.3	26.1
Hb	3.02	10.6	8.61

Table 2: Distribution of study subjects based on the clinical diagnosis

Clinical diagnosis	CASES (n=86)	Frequency (%)
Respiratory tract infections	26	30.2
Acute gastroenteritis	23	26.7
Fever	14	16.2
Dengue	08	9.3
Low birth weight	05	5.8
Prematurity	03	3.5
Pneumonia	02	2.3
Seizures	01	1.1
Others (tonsillitis, mumps, phimosis, irritability etc.)	04	4.6

Table 3: Distribution of anemic subjects according to patterns of anemia:

Pattern of anemia	CASES (n=86)	PERCENTAGE (%)
Microcytic hypochromic	58	67.4
Normocytic normochromic	26	30.2
Dimorphic	02	2.3
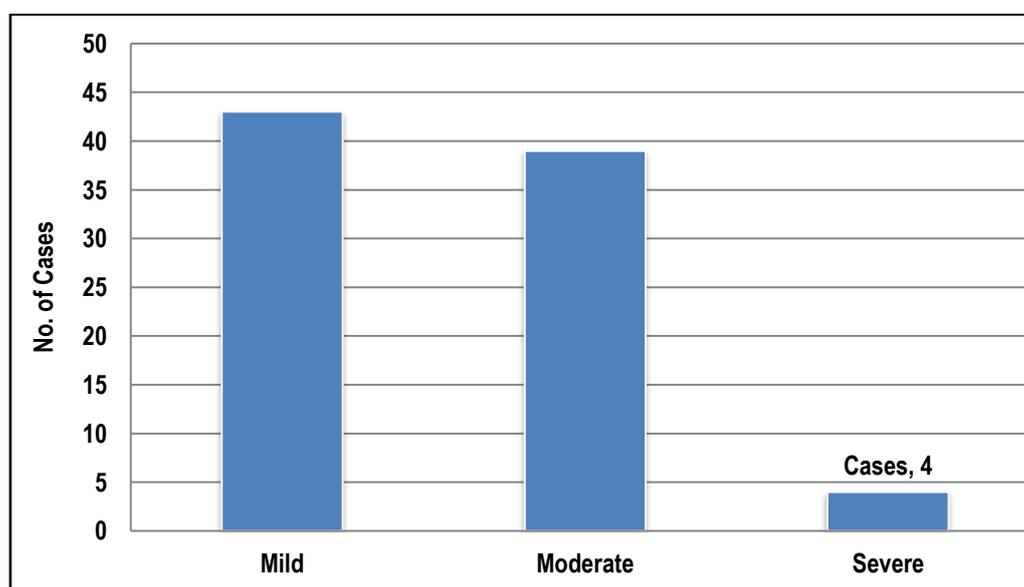
Fig 1: Show the distribution of anemic subjects according to severity of anemia

Table 4: Distribution of anemic subjects according to severity of anemia:

Pattern of anemia	CASES (n=86)	PERCENTAGE (%)
Mild	43	50.0
Moderate	39	45.3
Severe	04	4.6

There is always a controversial relationship between anemia and infection. It is agreed that iron excess or iron deficiency results in major changes in the immune response.[11] Anemia in most of the cases is an associated factor seen in hospitalized infants. The most common associated clinical illness being respiratory tract diseases, followed by gastrointestinal diseases. There is a greater utilization of hemoglobin due to the infection and increased respiratory effort in respiratory tract diseases. Whereas anemia in gastrointestinal disease is mainly because of increased blood loss in feces and vomitus and also by parasitic degradation. Infectious diarrhea was the most common cause for anemia in infants in a study by Lima et al.[12]

In our study respiratory tract infection was found to be the predominant illness with associated anemia (30.2%). In a study by Ramkrishna K et al., the hemoglobin level was found to be a risk factor for lower respiratory tract infections and there was 5.75 times more risk for anemic infants to develop LRTI compared to the control group. There is always a need for the prevention of anemia due to whatever etiology to reduce the incidence of LRTI in infants.[13] In the present study, majority of them had microcytic hypochromic anemia which was more common 67.4% and was similar to the study conducted by Kapur et al., where 43.2% infants had microcytic hypochromic anemia.[14]

In this study, around 43.6% hospitalized infants suffered from asymptomatic, mild to moderate anemia thereby emphasizing the presence of nutritional anemia in these infants. Therefore there is always a need for a detailed history taking which includes birth history, feeding history and examining the nutritional status of all admitted infants along with the required laboratory investigations, so that interventions can be taken at an earlier stage to prevent the consequences of the severe anemia among these infants. In various studies done in developing countries socioeconomic inequality with macro and micro nutrient deficiency as well as maternal nutrition status are considered as the major cause of anemia in children.[15]

CONCLUSION

These findings suggest that, the Prevalence of anemia was 43.6% in the present study with microcytic hypochromic anemia being the major cause (67.4%) suggesting iron deficiency as the major culprit for nutritional anemia seen in the infants. Nutritional anemia due to iron deficiency is the leading trace element deficiency seen in children. This is treatable as well as preventable problem in children. We need to ensure antenatal iron supplementation. Weaning food items should contain good sources of iron.

REFERENCES
1. Iron deficiency anaemia. Assessment, prevention, and control. A guide for programme managers. Accessed on 21 December 2016.Available at: http://www.who.int/nutrition/publications/en/ida_assessment_prevention_control.pdf.
2. Global estimates of the prevalence of anaemia in infants and children aged 6-59 months, 2011. Available at http://www.who.int/nutrition/publications/micronutrients/global_prevalence_anaemia_2011_maps.pdf. Accessed on 17 December 2016.
3. Xu K, Zhang CM, Huang LH, Fu SM, Liu YL et al. Risk factors for iron deficiency anemia in infants aged 6 to 12 months and its effects on neuropsychological development. Zhonqquo Dang Dai Er Ke Za Zhi. 2015;17(8):830-6.
4. Brabin BJ, Premji Z, Verhoeff F. An Analysis of Anemia and Child Mortality. J. Nutr. 2001;131(2):6365-6485.
5. Thankachan P, Walczyk T, Muthayya S, et al. Iron absorption in young Indian women: the interaction of iron status with the influence of tea and ascorbic acid. Am J ClinNutr. 2008;87(4):881–886.
6. Calis JC, Phiri KS, Faraghar EB, et al. Severe anemia in Malawian children. N Engl J Med. 2008;358(9):888 – 899.
7. Schneider JM, Fujii ML, Lamp CL, et al. Anemia, iron deficiency anemia and iron deficiency anemia in 12 – 36 months – old children from low income families. Am J Clin Nutr. 2005;82(6):1269–1275.
8. WHO – World Health Organization: Iron Deficiency Anaemia Assessment, Prevention and Control. A Guide for Programme Managers. Geneva: World Health Organization; 2001.
9. Saba F, Poornima S, Balaji P A, Varne SRR, Krishnamurthy J. Anemia among Hospitalized Children at a Multispecialty Hospital, Bangalore (Karnataka). IndiaJFamily Med Prim Care 2014;3(1):48-53.
10. F Akin, E Selma, C Kilicaslan, S B Boke, S Arslan. Iron Deficiency Anemia among Hospitalized Children in Konya, Turkey. Anemia 2013;1(2):32-35.
11. Dos Santos RF, Gonzalez ES, de Albuquerque EC, deArruda IK, DinizAda S, Figueroa JN, Pereira AP. Prevalence of anemia in under five-year-old children in a children's hospital in Recife, Brazil. Rev Bras Hematol Hemoter 2011;33(2):100 doi: 10.5581/1516-8484.20110028.
12. Lima AC, Lima MC, Guerra MQ, Romani SA, Eickmann SH, Lira PI. Impact of weekly treatment with ferrous sulfate on hemoglobin level, morbid and nutritional status of anemic infants. J Pediatr (Rio J). 2006;(82):452 – 7.
13. K Ramakrishnan, PS Harish. Hemoglobin Level as a Risk factor for Lower Respiratory Tract Infections. Indian J Pediatr 2006; 73(10): 881-83.
14. Kapur D, Aggarwal KN. Iron status of children aged 9 – 36 months in an urban slum ICDS Project in Delhi. Indian Ped 2002;39:136 – 44.
15. Tatala S, Svanberg U, Mduma B. Low dietary iron availability is a major cause of anemia: a nutrition survey in the Lindi District of Tanzania. Am J Clin Nutr. 1998;68(1):171-8.