

A study of patterns of anemia in hospitalized infants at a tertiary care hospital

Shwetha J.H.¹, Ashoka A.^{2,*}, Shashikala P.³

¹Associate Professor, ³Professor & Head, Dept. of Pathology, SS Institute of Medical Sciences, Davangere, ²Associate Professor, Dept. of Pediatrics, Jagadguru Jayadeva Murugarajendra Medical College, Davangere

***Corresponding Author:**

Email: ashokdavangere@gmail.com

Abstract

Introduction: Anemia can negatively affect cognitive development, school performance, physical growth and immunity of the children if not treated during infancy.

Objectives: To determine the pattern of anemia among 6 months – 12 months infants.

Materials and Method: This prospective hospital based study was conducted for a year among the infants aged 6-12months admitted to tertiary care hospital in Davangere. All those who were hospitalized for any other illness but found to have anemia on routine blood investigations were included and complete haemogram was done to determine the type of anemia. Data was entered in excel sheet and analyzed using SPSS- 20 software.

Results: In the present study, 211 infants were anemic, mean age was 8.6 ± 2.4 months, majority were females (56.9%), more than half of them had presented with respiratory tract infections and acute gastroenteritis (64%). Mean hemoglobin was 8.54 ± 1.09 g/dl. Majority of them had moderate anemia (83%) and microcytic hypochromic anemia was the most common presentation (45%).

Conclusion: To conclude, the Prevalence of anemia was 66% in the present study with microcytic hypochromic anemia being the major cause (44.8%) suggesting iron deficiency as the major culprit for nutritional anemia seen in infants.

Keywords: Anaemia, Infants, Microcytic Hypochromic, Tertiary Care.

Introduction

Anemia is one of the most common nutritional disorder occurring worldwide. The WHO Global Database on anemia for 1993-2005, estimated prevalence anemia worldwide at 25%, affecting about a quarter of the world population, especially children and women of reproductive age.^(1,2)

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.⁽⁴⁻⁹⁾

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.⁽⁵⁾ early diagnosis and appropriate treatment, helps in preventing such problems and hence the present study was

undertaken to determine the pattern of anemia among 6 months – 12 months infants.

Materials and Method

A prospective study was carried out for a year (December 2014 to November 2015) in a tertiary health care center in Davangere, Karnataka after obtaining the ethical clearance from the institution. All the infants between 6 months – 12 months, who were hospitalized 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.

2 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 using automated cell counter method using SYSMEX automated hematology analyzer XT-2000i/XT-1800i/2010 Japan. 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.

Data was entered in excel sheet and analyzed using SPSS- 20 software. Results were expressed in terms of descriptive statistics like percentage and proportions.

Results

A total of 320 infants of age group 6 months – 12 months were admitted during the study period, among which 211 infants who fulfilled the criteria were

included for the present study. Among the study group, there were 91(43.1%) males and 120 (56.9%) females. The mean age was 8.6 ± 2.4 months. Out of 211 infants who were included in the study, more than half of them had presented with respiratory tract infections and acute gastroenteritis (Table 1)

Table 1: Distribution of study subjects based on the clinical diagnosis

Clinical diagnosis	Frequency (%)
Respiratory tract infections	69 (32.7)
Acute gastroenteritis	65 (30.9)
Fever	33 (15.6)
Dengue	15 (07.11)
Low birth weight	08 (03.8)
Prematurity	05 (02.37)
Pneumonia	05 (02.37)
Seizures	03 (01.42)
Nephrotic syndrome	02 (00.95)
Others (tonsillitis, mumps, phimosis, irritability etc.)	06 (02.8)

Mean hemoglobin was 8.54 ± 1.09 g/dl, the lowest value being 3.3 g/dl. Based on WHO classification, 83.4% had moderate anemia, 6.6% had Mild anemia, and 10% had severe anemia. Microcytic hypochromic anemia was observed in majority of the cases (44.8%) followed by normocytic normochromic anemia in 41.0% of cases. Dimorphic anemia was seen in only 1.89% of cases.

Table 2: Distribution of study subjects based on hematological parameters

Parameters	Minimum	Maximum	Mean
Hb	3.3	10.8	8.54
MCV	52	115	72
MCH	14.2	41	23.8
MCHC	26.1	49	31.7
RDW	5.6	22.6	10.7
RBC	2.07	5.59	3.78
PCV	11.1	35.5	28.1

Table 3: Comparison of severity of anemia among preterm and term infants

	Hemoglobin >7gm/dl	Hemoglobin <7gm/dl
Preterm infants	2	3
Term infants	188	18
Total	190	21

(Fisher exact test, $p=0.0075$)

On comparison between preterm and term babies, severe degree of anemia was seen more commonly in preterm infants (60%) whereas only 8.74% of term

infants had severe anemia and the difference of which was found to be statistically significant.

Discussion

Out of the 320 infants who were admitted in our hospital during the study period around 66% (211) 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.⁽¹⁰⁾ 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.⁽¹¹⁾ In our study the female infants predominantly suffered from anemia (56.9%), 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,⁽¹²⁾ the reason being that the study was done in two different countries.

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.⁽¹²⁾ 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.⁽¹²⁾ Infectious diarrhea was the most common cause for anemia in infants in a study by Lima et al.⁽¹³⁾ In our study respiratory tract infection was found to be the predominant illness with associated anemia (32.7%). 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.⁽¹⁴⁾

In the present study, majority of them had microcytic hypochromic anemia which was similar to the study conducted by Kapur et al., where 43.2% infants had microcytic hypochromic anemia.⁽¹⁵⁾

In this study, around 66% 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.

Conclusion

To conclude, the Prevalence of anemia was 66% in the present study with microcytic hypochromic anemia being the major cause (44.8%) suggesting iron deficiency as the major culprit for nutritional anemia seen in infants.

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