



## Original Research Article

## Morphological pattern based analysis of anemia in paediatric age group

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## ABSTRACT

**Introduction:** Anemia is a global public health problem and is a significant contributor to the global health disease. It is more prevalent among low socioeconomic groups. Young children are more vulnerable to the effects of anemia since it retards the physical and mental growth and development.

**Material and Methods:** Hospital based prospective cross sectional study was undertaken for a period of 3 months. 200 cases were included for the study with hemoglobin less than 12g% and age group ranging from 6 months to 5 years.

**Results:** Maximum numbers of the patients were in the range of 6 months to 1 year. Proportions of anemia in males was 58% when compared to females 42%. Microcytic hypochromic anemia was the commonest type of anemia. Of 200 children with anemia studied, 102 children had Microcytic Hypochromic Anemia, 41 children had Normocytic Normochromic Anemia, 38 children had Normocytic Hypochromic Anemia, 15 children had Dimorphic Anemia and 4 children had Macrocytic Anemia.

**Conclusion:** Study of patterns of anemia is essential to direct the investigation since it reflects the underlying etiopathological factors. The Peripheral smear study with automated hemogram is beneficial and sufficient for diagnosis and morphological sub typing of anemia for the Paediatric population.

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## 1. Introduction

Anemia is a major problem affecting all age groups across the world. Anemia is a clinical condition in which there is decreased red blood cell count and hemoglobin levels.<sup>1</sup> Anemia is prevalent in about one fourth population of the world.<sup>2</sup> Anemia plays an important role in morbidity and mortality among children.<sup>3</sup> Anemia is a manifestation and not a disease per se. Malnutrition is the most common cause of anemia among children. Nutritional anemia due to iron deficiency, vitamin B12 or folic acid deficiency and hookworm infestation can be easily prevented and treated.<sup>4</sup> Routine investigations like complete blood count and Peripheral smear are useful to investigate case of anemia.

## 2. Materials and Methods

The study was conducted on 200 cases among children aged between 6 months and 5 years who were referred to Hematology laboratory, department of Pathology at Mysore medical college and research institute for a duration of 3 months.

The anticoagulated blood samples were analyzed by an automated counter Sysmex XN 1000. RBC parameters like RBC count, Hemoglobin, Hematocrit, Mean cell volume, Mean cell hemoglobin, Mean cell hemoglobin concentration and Red cell distribution width were studied.

## 3. Results

The cases were in the age group between 6 months and 5 years. A total of 200 cases with hemoglobin less than 11g/dl were included in the Prospective study group.

116 cases (58%) were males and 84 cases (42%) were females. So majority of the males were affected by anemia

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**Table 1:** The following patterns were observed:

Morphology	No.of Cases	Percentage
Normocytic normochromic anemia	41	20.5%
Normocytic hypochromic anemia	38	19%
Microcytic hypochromic anemia	102	51%
Macrocytic anemia	4	2%
Dimorphic anemia	15	7.5%

**Table 2:** Sex wise distribution of anemia

Gender	No of cases
Male	116
Female	84

**Table 3:** Comparison of morphological types of anemia

Morphology	Our study	RathnaS <sup>5</sup> et al study
Normocytic normochromic anemia	20.5%	55%
Normocytic hypochromic anemia	19%	11%
Microcytic hypochromic anemia	51%	27%
Macrocytic anemia	2%	4%
Dimorphic anemia	7.5%	3%

(Table 2) and is similar to the study conducted by Gombur.<sup>5</sup>

Our study results are compared with study done by Rathna S<sup>6</sup> et al. The commonest morphological type observed was Microcytic hypochromic anemia (51%) followed by Normocytic normochromic anemia (20.5%) as shown in (Table 3)

The anemia was subtyped again based on the morphology as shown in (Table 1). The morphological categories given were

1. Normocytic normochromic anemia (NCHC)
2. Normocytic Hypochromic anemia (NHA)
3. Microcytic hypochromic anemia (MCHC)
4. Macrocytic anemia (MA)
5. Dimorphic anemia (DA)

#### 4. Discussion

Anemia has high prevalence in preschool children. The most common cause of anemia in Paediatric age group is Iron deficiency anemia which is associated with Microcytic hypochromic pattern. So supplementing with iron tablets and syrups, iron rich diet will prevent and treat the cause.<sup>7</sup>

In these days due to modern lifestyle people are prone to nutritional anemia. The most common types of anemia are Microcytic hypochromic anemia (63%) followed by Normocytic normochromic anemia (24%), Normocytic hypochromic anemia (9%), and Dimorphic anemia<sup>8</sup>

Approximately 50% of the population suffers from nutritional anemia as known in countries where meat consumption is low<sup>9</sup>

In our study male were more affected than female children. This is similar to studies conducted by Roosy

Aulakh, et al<sup>10</sup> included 151 children with 106(70.2%) boys and 45(29.8%) girls.

#### 5. Conclusion

Anemia is a major health issue among children as it is associated with delayed milestones, recurrent illness, increased mortality and morbidity.

Routine screening programs using cost effective basic blood parameters are useful to detect and treat anemia among vulnerable children.

Study of morphology is useful to know the causative factors and hence provides information to prevent and treat anemia.

Special investigations like serum iron profile, vitamin B12 & folic acid assays are useful for further workup to diagnose nutritional anemia. Suitable investigations like Hemoglobin electrophoresis and bone marrow study are useful to confirm the diagnosis and to guide treatment.

#### 6. Source of Funding

None.

#### 7. Conflict of Interest

None

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