Hematological finding of Anemia in Pediatric Population

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Abstract
Introduction- Anemia is characterized as an inadequate RBC mass to satisfactorily convey oxygen to peripheral tissues. Hemoglobin is a protein that allows red blood cells to deliver oxygen to other cells in the body. Childhood anemia is one of the most notable healthful issue confronting mothers and children in India. Deficiency anemia is a major health condition worldwide. **Objective-** To evaluate anemia in pediatric age group (6months to 12years). **Method-** A retrospective cross- sectional study in male and female child aged from 6months to 12years who were hospitalized in Chacha Nehru hospital associated with M.Y. Hospital, Indore from May2020 to May 2021 **Results -**Children with a hemoglobin concentration less than 11 g/dL were considered anemic. **Conclusion-** Appropriate screening and diagnostic testing will permit most instances of iron deficiency to be analyzed at the soonest. Blood indices are fundamental prior to treating children with symptoms of anemia to stay away from undesirable incidental effects.
Keywords: Anemia Nutritional deficiency anemia, Sickle cell anemia.
Study Design- Observational Study

Introduction

Anemia is characterized as a inadequate RBC mass to sufficiently convey oxygen to peripheral tissues [1]. Childhood anemia is one of the main wholesome problem confronting mothers and children in India. It is a widespread health issue that happens in both developed and developing nations. Globally around 30% of the total population is suffering from anemia. In India, 70 million i.e., 60-70% suffer from varying degree of anemia from total 150 million children [2]. Most of anemia course is progressively and slow and often go unnoticed .Iron defiiciency remains most important cause. . In children, due to poor nutrition ,faulty feeding habits and breast milk poor source of iron and other nutritional deficiency causes anemia [3,4].During infancy and childhood that is 6months-12 year have greater tendency to develop anemia due to rapid growth and more requirement of nutrients like iron, vitamin B12 and folic acid [5]. Anemia in children varies from those of grown-ups as they will more often than not be more articulated and grow quickly. As much as 51% youngsters in 0-4 years and 46% kids 5-12 years are in developing regions [6,8].

Anemia has multiple causative association that is with financial, biological ,familial, nutritional and dietary factors..Main aim of study is to evaluate and assess anemia in pediatric population and its relationship with demographic profile in less than 12-year-old children who were admitted to chacha Nehru Hospital, Indore(M.P.)

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Method

This is a retrospective cross-sectional study conducted at the Chacha Nehru hospital associated with M.Y. Hospital, Indore. Children aged between 6 months and 12 years old who had been hospitalized between May2020and May 2021, their hemoglobin level , complete blood count, reticulocyte count, sickling test, peripheral smear and bone marrow aspiration studied. Hemoglobin, PCV, MCV, MCH, MCHC and RDW were determined by automated cell counter. Reticulocyte count was done by Brilliant crystal stain method. Peripheral smear and bone marrow aspiration was stained by Romanowsky stain .Sickling test was done by sodium metabisulphite reagent. The WHO criterion (hemoglobin < 11 g/dL) was used to diagnose anemia [6]. To categorize the degree of anemia, the following cut-off points were used: 10.0-10.9 g/dL - mild anemia; 7.0-9.9 g/dL - moderate anemia; < 7 g/dL - severe anemia.
According to the morphology of RBCs in the peripheral smear studied anemia were classified in microcytic , normocytic and macrocytic.

Inclusion criteria
Patients with anemia in age group of 6months to 12 years admitted in MYH , Hospital, Indore included in this study.

Exclusion criteria
More than 12 years, out patients who were not admitted in the hospital, Patients having myeloproliferative disorder, lymphoprol-iferative disorder and anemia due to malaria, and patients collapsed due to congestive cardiac failure within 12 hours of admission, communicable diseases like HIV, tuberculosis & hepatitis were excluded.

Result
200 patients were admitted to pediatric ward of Chacha Nehru hospital Indore from May 2020 to May 2021 in which 80 were females and 120 males (Table-1). In the present study it was found that of half (100) children were anemic because of iron deficiency

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while 13% (26) were thalassemic and 15% (30) were having sickle cell disorder. 20% (40) cases had megaloblastic anemia and 2% (4) with aplastic anemia (Table-2).
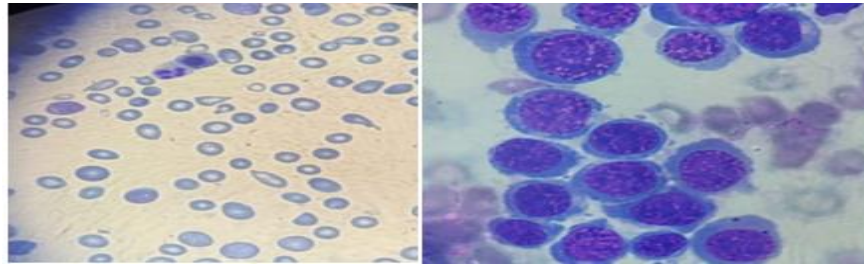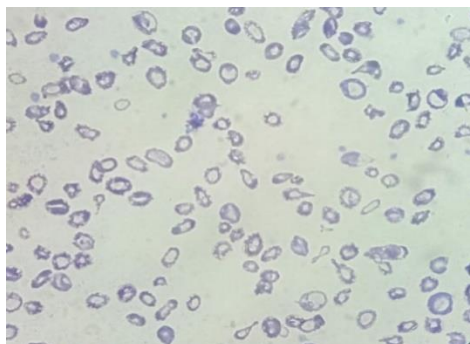

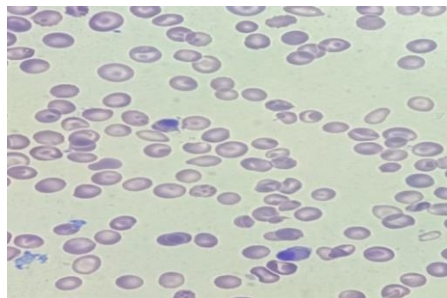**Megaloblastic anemia-Fig-1 – Peripheral smear**
Fig-2- Bone marrow aspiration show erythroid hyperplasia and show macroovalocytes with tear drop cellssieve like erythroblast
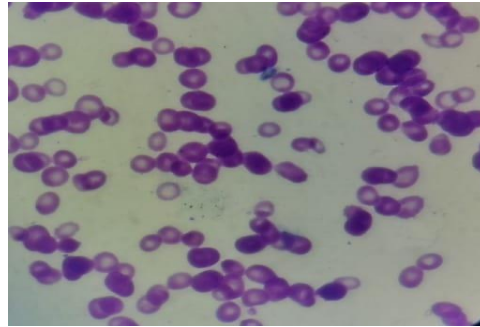**And cabot ring.**
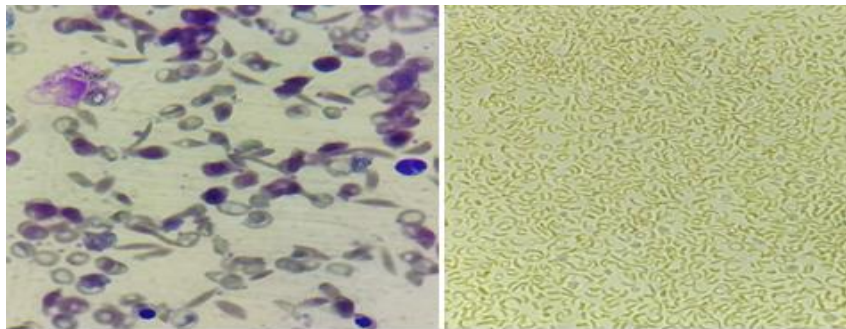
Sickle cell anemia- Fig-1- Peripheral smear showing sickle cells
Fig-2 –Sickling test showing sickle cells and nucleated red cells

Iron deficiency anemia- Fig-1-Peripheral smear showing Anisopoikilocytosis with microcytosis and hypochromia along with few tear drop cells and pencil cells

Thalassemia- Fig-1- Peripheral smear showing anisopoikilocytosis with target cells and nucleated red cells

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Aplastic anemia-Fig-1- Peripheral smear showing pancytopenia

Table 1: Gender wise distribution of anemia

Year	2020	2021	Total
Male	65	55	120
Female	50	30	80
Total	115	85	200

Table 2: Prevalence of different types of anemia

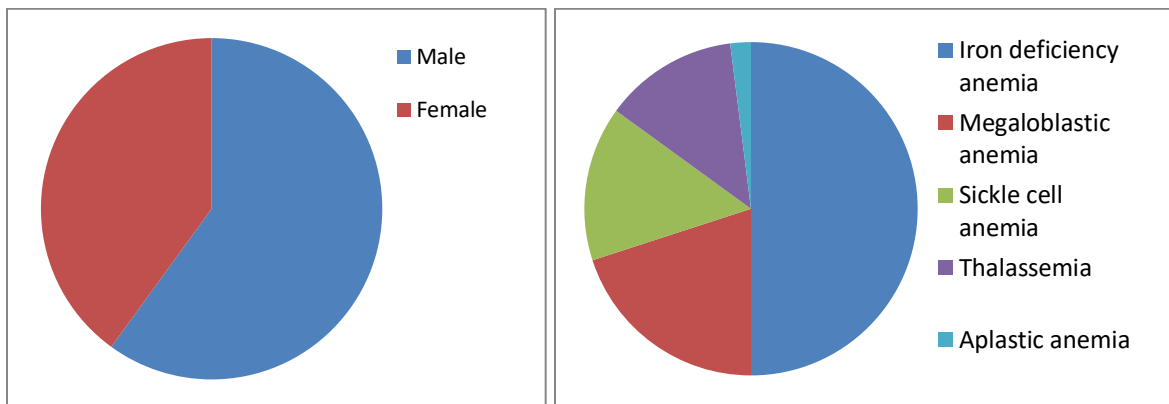| Disease	Number of cases	%
Iron deficiency Anemia	100	50
Megaloblastic Anemia	40	20
Sickle cell Anemia	30	15
Thalassemia	26	13
Aplastic Anemia	04	02

Figure 01: Gender wise distribution of anemia
Figure 02: Prevalence of different types of anemia

Discussion

In the current review it was noticed that iron deficiency was cause of anemia of in 50% (100) children while 13 % (26), 15% (30) were suffering from thalassemia and sickle cell disorder respectively. Rationale reason for the cause of anemia more in male as compared to females can be because of diet **low in iron**, or some vitamins or minerals, due to surgery Long-term illnesses, such as infections, or kidney or liver disease. Family history of an inherited type of anemia, such as sickle cell anemia [10].

Anemia may occur without symptoms and may be detected identically during medical examination. When severe enough, clinical features due to anemia result from hypoxia such as fatigue, weakness ,dizziness, fainting and mental confusion with signs of pallor of skin, mucous membranes and conjunctiva.

Classification of anemia

Etiological classification of anemia
1. Anemia due to decreased production of red blood cells

Nutritional deficiencies- iron deficiencies anemia, megaloblastic anemia.

Anemia of chronic disease

Sideroblastic anemia

Aplastic anemia

Anemia due to malignancies

Congenital dyserythropoietic anemia

2. Anemia due to increased red cells destruction(Hemolytic anemia)

Herediatary- Defect in red cell membrane- Herediatryspherocytosis , hereditary eliptocytosis.

Defect in hemoglobin- Sickel cell anemia, thalassemia and hemoglobin E disease.

Defect in red cell enzymes- Glucose 6 phosphate dehydrogenase deficiencies.

Acquired- Autoimmune hemolytic anemia

Proximal nocturnal hemoglobinuria

•   Hemolytic transfusion reaction

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- Hemolytic disease of newborn

Hypersplenism

- Malaria

3. Anemia due to acute blood loss Hemorrahge due to trauma, massive gastrointestinal bleed in.

Conclusions

One of the major regions for development in essential medical care is anticipation of iron deficiency since it has been related with delay in psychomotor advancement particularly in preschool age. The present study show magnitude of anemia in children which tells the fact that anemia in the population is a matter of concern which is related to malnutrition Screening and diagnostic testing will permit diagnosis of anemia as early as possible and provide timely intervention. Basal blood indices are required prior to treating children with symptoms of anemia to stay away from undesirable secondary effects. Low socioecomic status, poverty hunger is common in our country. Blood parameters are connected with each other as well as with the gender and age groups, proper and adequate monitoring and intervention plan is needed to give nutritional supplementation to eliminate anemia. We recommend awareness creation on water, sanitation,hygiene and counselling to family members on consumption of food containing iron to prevent anemia.

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