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Evaluation of Prevalence of Anaemia among Paediatric Patients Reporting for Routine Medical Check-Up: An Institutional Based Study

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ABSTRACT

Background: Anemia is one the frequently observed hematological abnormality seen amongst pediatric practice. Leukemias are defined as malignant diseases that are of hematopoietic origin and are characterized by the unrestrained overproduction of immature or terminally differentiated white blood cells. The aim of the present study was to evaluate the prevalence of anemia amongst children reporting to the department.

Materials and Methods: The present study was conducted in the department of pediatrics and enrolled all the subjects reporting to the department for medical consultation. Approximately 5 ml of blood was withdrawn under complete aseptic conditions and placed in EDTA container. Leishman's stain was used for the estimation of blood morphology. All the data was arranged in a tabulated form and analyzed using SPSS software. The data was expressed as percentage of total value.

Results: The present study enrolled a total of 100 subjects, out of which 57 were between 0-1 years of age, 24 were between 1.01 to 5 years of age and 19 were between 5.01- 10 years of age. There were 54.5% males with mild, 27.3% males with moderate and 18.2% males with severe anemia. There were 45.7% subjects with iron deficiency anemia, 28.6% were detected with sickle cell anemia.

Conclusion: From the above study we can conclude there were 35% anemics in the present study. Male children are most commonly affected. The most common type of anemia is iron deficiency anemia

Keywords: Anemia, Aseptic, Children.

INTRODUCTION

Anemia is one the frequently observed hematological abnormality seen amongst pediatric practice.^[1,2] It has multifactorial causes like nutritional deficiencies, genetic disorders of red blood cells and infection.^[3] Iron deficiency leads to impairment of the cognitive development of children predominantly in India.^[4] The types of anemia can be malignant or non-malignant types, that affects the well-being of children.^[5] Different studies have shown that malaria,⁶⁻⁸ iron deficiency,^{9,10} HIV,^{11,12} glucose-6 phosphate dehydrogenase deficiency, sickle cell anemia⁶⁻⁷ and intestinal worm infestations¹³ are possible reasons of anemia. Leukemias are defined as malignant diseases that are of hematopoietic origin and are characterized by the unrestrained overproduction of immature or terminally differentiated white blood cells.¹⁴ Approximately 30% of all the malignancies of childhood belong to category of Acute leukemia. Even with the advancement in the diagnostic criteria's there is still lack of adequate treatments for

leukemia. Chemotherapy remains the main stay of the management. Anemia amongst the young children especially younger than 5 years of the age is associated with considerable morbidity and mortality than amongst children of higher age group. The main purpose to determine the incidence of anemia is to accurately determine the protocols to prevent and control this disease.¹⁵ The aim of the present study was to evaluate the prevalence of anemia amongst children reporting to the department.

MATERIALS AND METHODS

The present study was conducted in the Department of Pediatrics, Pacific Institute of Medical Sciences, Udaipur, Rajasthan, India and enrolled all the subjects reporting to the department for medical consultation. The study included subjects between 0- 12 years of age. Children elder than this were not included in the study. All the subjects were informed about the study and a written consent was obtained from them in their vernacular language. The study was approved by the institute's ethical board. Approximately 5 ml of blood was withdrawn under complete aseptic conditions and placed in EDTA container. Procedure explained by Helena Biosciences was used for the estimation of hemoglobin. Classification of anemia was based upon the criteria given by the world health organization. Leishman's stain was used for the estimation of blood morphology. Serum transferrin, ferritin, iron binding capacity was evaluated from the serum obtained from the sample. The causes of anemia amongst the subjects was also evaluated. The demographics, nutritional status and the parent's occupation was also noted. All the data was arranged in a tabulated form and analyzed using SPSS software. The data was expressed as percentage of total value.

RESULTS

The present study enrolled a total of 100 subjects, out of which 57 were between 0-1 years of age, 24 were between 1.01 to 5 years of age and 19 were between 5.01- 10 years of age. Out of these there were 65 non-anemic and 35 were anemic. There were 33.3% anemics between 0-1 years of age. There were 37.5% anemics between 1.01- 5 years of age. There were 36.8% children between 5.01-10 years of age. (table 1)

Table 2 shows the gender related distribution of severity of anemia. There were 54.5% males with mild, 27.3% males with moderate and 18.2% males with severe anemia. A total of 22 males were anemic. There were 15.4% females with mild, 76.9% females with moderate and 7.7% females with severe anemia. There were total 13 females who were anemic.

Table 3 illustrates the etiological classification of anemia. There were 45.7% subjects with iron deficiency anemia, 28.6% were detected with sickle cell anemia. Normocytic normochromic anemia was seen amongst 14.3% subjects. Anemia from chronic disease was seen amongst 11.4% cases. There were 2.8% cases of megaloblastic anemia.

Table 1: Age related prevalence of anemia amongst the subjects

| Age (years) | Non- anemic | Anemic | Total |
|--------------|-------------|-----------|-------|
| 0-1 | 38(66.7%) | 19(33.3%) | 57 |
| 1.01-5 | 15(62.5%) | 9(37.5%) | 24 |
| 5.01-10 | 12(63.1%) | 7(36.8%) | 19 |
| Total | 65 | 35 | 100 |

Table 2: Gender related distribution of severity of anemia

| Age (years) | Mild | Moderate | Severe | Total |
|---------------|-----------|-----------|----------|-----------|
| Male | 12(54.5%) | 6(27.3%) | 4(18.2%) | 22(62.9%) |
| Female | 2(15.4%) | 10(76.9%) | 1(7.7%) | 13(37.1%) |
| Total | 14(40%) | 16(45.7%) | 5(14.3%) | 35(100%) |

Table 3: Etiological classification of anemia

| Type | Incidence |
|---------------------------------------|-----------|
| Iron deficiency anemia | 16(45.7%) |
| Sickle cell anemia | 10(28.6%) |
| Normocytic normochromic anemia | 5(14.3%) |
| Anemia of chronic disease | 4(11.4%) |
| Megaloblastic anemia | 1(2.8%) |

DISCUSSION

Anemia is a worldwide public health delinquent affecting around 56 million people and two thirds of them belong to developing countries.¹⁶ It is related with a reduction in hemoglobin levels with a concomitant reduction in the haematocrit level. According to WHO, Anemia is defined by as hemoglobin less than 12 g/dL in adult non-pregnant females and less than 11g/dL in pregnant females. Hemoglobin less than 12g/dl in male children and less than 11g/dl in female children is also regarded as anemia.¹⁷ Anemia is a common clinical condition encountered amongst the children under 5 years of age in day to day pediatric practice. A study conducted in the Paediatrics Department of Sokoto, North- Western Nigeria showed a high prevalence of anemia approximately 50% due to severe malaria¹⁸. In our study, there were 54.5% males with mild, 27.3% males with moderate and 18.2% males with severe anemia. A total of 22 males were anemic. There were 15.4% females with mild, 76.9% females with moderate and 7.7% females with severe anemia. There were total 13 females who were anemic. Diagnosis of anemia is typically based on the complete blood cell count. Apart from the number of red blood cells, size of red blood cells by flow cytometry is helpful in distinguishing the reasons of anemia. In regions where, automated analyzers are no easily accessible their blood smear examination under microscope is helpful in examination of size of blood cells. In nowadays practice, red blood cells count, hemoglobin concentration, packed cells volume and various other parameters like, mean corpuscular volume, mean corpuscular hemoglobin, and mean corpuscular hemoglobin concentration need to be calculated, and compared against values adjusted for age and gender. Other tests for differential diagnosis of anemia include haemoglobinopathies, testing for malaria, estimation of serum iron and total iron binding capacity.¹⁹ In our study, there were 45.7% subjects with iron deficiency anemia, 28.6% were detected with sickle cell anemia. Normocytic normochromic anemia was seen amongst 14.3% subjects. Anemia from chronic disease was seen amongst 11.4% cases. There were 2.8% cases of megaloblastic anemia. According to a study there were 76.2% anemic children under 5 years of age and the most commonly affected age is 2 years with M: F of 2:1.7

In Africa, there are about 12-29% of the hospitalized children who are anemic and the fatality rate ranges from 8 to 17%.²⁰ Anemia is a major problem of concern amongst Nigerian subjects. It has led to various complications like chest pain. Splenomegaly, jaundice, heart failure and limb swelling. 8 In the developing countries, severe anemia is a common life-threatening condition in the pediatric emergency department.²¹

CONCLUSION

From the above study we can conclude there were 35% anemics in the present study. Male children are most commonly affected. The most common type of anemia is iron deficiency anemia. People of all age groups need to be educated and made aware about anemia. It is a preventable condition and can be controlled with good nutritional practices and early management strategies.

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