A Clinico - hematological Profile of Anemia in Children Aged 5 – 14 Years at Tertiary Care Centre, RIMS, Raichur

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Abstract

Background and Objective: Anemia is a major global health problem especially in developing countries like India . The prevalence of anemia among school children is 25.4% and the studies on school age children were very few, hence this study was taken.

Methods: A prospective study done in children aged 5-14 years presenting with anemia during the period from December 2019 to June 2021. A total of 500 cases were studied.

Results: A total of 500 cases were studied of which the maximum incidence of anemia was found in 5-8 years age group. Male to female ratio was 0.9:1. Pallor was the most commonest clinical sign followed by weakness and fatigability. Anemia was graded according to World Health Organisation (WHO) criteria. The maximum cases were under Grade III category (severe –Hb-<7gm/dl) in the age group of 5 -8 years in females.

Among the morphological type, majority were Microcytic hypochromic anemia (68.4%) , Normocytic hypochromic anemia (25.4%), Dimorphic anemia (3.6%), Normocytic normochromic blood picture (2.4%) and 1 case of Sickle Thalassemia(0.2%).

The prevalence of anemia was found to be 18% in our study.

Conclusion: The most common type of anemia was Microcytic hypochromic anemia. Majority of the cases were from rural area(90%) than urban(10%).

The present study concludes that early diagnosis of a specific type of anemia will help in timely management as well as definitive treatment which will aid in better cognitive and motor development in children.

Keywords: Anemia; Microcytic hypochromic anemia; Child; Pallor

Introduction

Anemia is a nutritional problem worldwide affecting almost two billion people with an increased risk of morbidity and mortality in young children, adolescent girls, and pregnant women[1,2]. Anemia describes a condition in which an individuals hemoglobin level (or hematocrit) falls two standard deviations below the average mean of normal for individuals of same age, sex and altitude[3].

Anemia is the most common hematologic disease of the paediatric age group and is the most widespread nutritional problem in the world and has predominance in developing countries like India, particularly in children and women. In India children have high prevalence of anemia varying from 27% to 90% has been reported in different studies[4].

The causes of anemia may be categorized depending on red cell morphology or size (cytometric or morphologic classification), the underlying patho-physiologic mechanism (aetiologic or erythrokinetic or biologic classification), marrow responsiveness or based on its biochemical or molecular basis[5].

Anemia is a feature of many topical diseases including Human immunodeficiency virus/Acquired

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Immunodeficiency syndrome (HIV/AIDS), malaria, and tuberculosis, parasitic infections such as schistosomiasis and hookworm infestations.

In Nigeria, a retrospective study was done and found the prevalence of anemia among patients receiving care in a tertiary hospital was found to be 27.3%[6]. The studies on prevalence of anemia have been done on preschoolers only,[7,8] so there is a need for more studies related to anemia in school going children. The continuation of limited iron stores at birth, timing of umbilical cord clamping, type of supplementary food introduction and frequency of infections account for high prevalence of iron deficiency in India.

The prevalence of anemia is an important health indicator and when it is evaluated with other ancillary investigations like iron status, haemoglobin concentration can provide information about the severity of iron deficiency[16] which is a leading cause of morbidity and mortality worldwide[9,10].

General approach to treating anaemia include methods for promotion of red cell production in hypoproliferative anaemia such as nutritional supplements in nutritional anaemia, limitation of red cell destruction in haemolytic anaemia such as immunosuppressive therapy in auto-immune haemolytic anaemia and arrest of bleeding in anemia of blood loss.

Methods

Prospective study was done in the Department of Pathology at Raichur Institute of Medical Sciences, from December 2019 to June 2021. Ethical approval was taken from the Institutional Ethics Committee, RIMS, Raichur.

A total of 500 patients between 5 years to 14 years presenting with anemia according to WHO criteria and thorough history and clinical examination as per the proforma was documented.

Complete haemogram evaluation was analysed with Sysmax analyser (5 parts- XN350). Leishman stain, May Grunwald Giemsa were used for peripheral smear, Bone marrow aspiration smears & New Methylene blue for Reticulocyte count routinely. Perls stain was done wherever applicable. Tests such as Serum ferritin, serum B12 & folate estimation, bone marrow aspiration, biopsy and hemoglobin electrophoresis were done wherever required.

Other ancillary tests including stool and urine examination were done whenever required.

Inclusion criteria

All Pediatric patients aged 5 years to 14 years presenting with anemia to pediatric department in Raichur institute of medical sciences.

Exclusion criteria

Children less than 5 years and more than 14 years of age.

Results

A total of 500 cases between 5 – 14 years were included in the study. The most common affected age group was 5 – 8 years (43.6%). The age wise distribution of anemia in our study was found statistically significant.

Table 1: Age wise distribution of anemia.

| Age(yrs)	Frequency	%	P value
5-8	218	43.6	
9-11	123	24.6	< 0.005
12-14	159	31.8	
Total	500	100	

The age ranged from 5 years to 14 years & maximum incidence was found in the 5- 8 years group (43.6%) and the mean age was 9.63 years and was found statistically significant.

Graph 1: Gender distribution
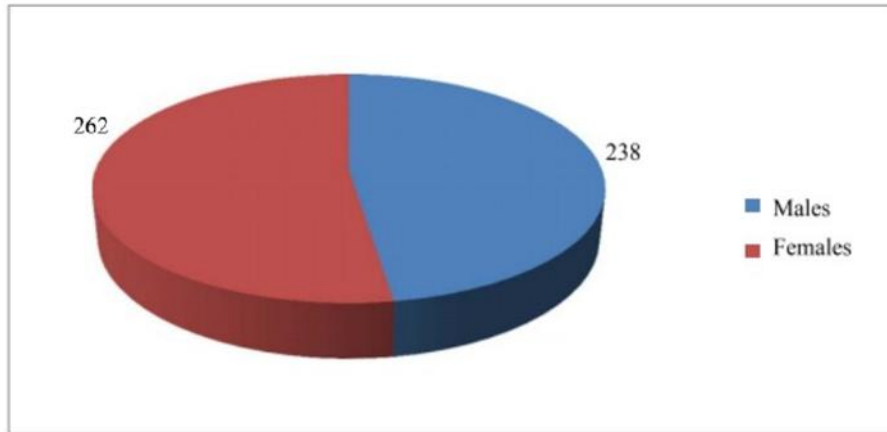
Among 500 cases 238 were males (47.6%) & 262 were females (52.4%) with female preponderance and found prevalence of < 0.005 which was statistically significant

Graph 2: Analysis of Clinical signs & symptoms
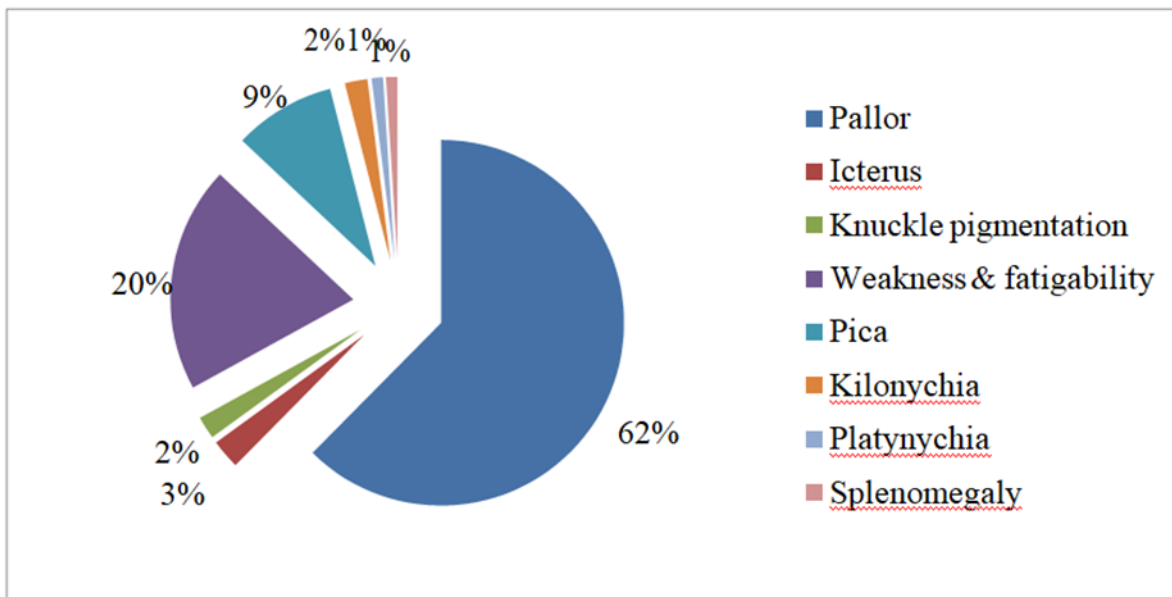
The most common presenting symptom was weakness and fatigability in 100 cases (20%) & pallor was the commonest sign on examination which was found in 312 cases (62.4%) followed by Koilonychia (2%), platynychia (1%) & knuckle pigmentation (2%).

Table 2: Grading of anemia as per WHO criteria.

Grading of anemia	Number of children	%

Mild anemia(>10 gm/dl)- Grade 1	97	19.4
Moderate anemia(7-10 gm/dl)- Grade 2	193	38.6
Severe anemia(<7 gm/dl)- Grade 3	210	42
Total	500	100

About 210 cases (42%) had severe anemia, 193 cases (38.6%) had moderate anemia & mild anemia were 97 (19.4%) respectively . Majority were belonging to severe anemia.

The most common morphological type of anemia was Microcytic hypochromic anemia (MHA) ie 342 cases (68.4%) followed by Normocytic hypochromic anemia 127 cases (25.4%), Dimorphic anemia 18cases (3.6%), 12 cases (2.4%) had Normocytic normochromic blood picture and 1was Sickle thalassemia (0.2%) and was statistically significant with p value of <0.005.

Out of 342 cases of Microcytic hypochromic anemia, 83 cases (34.3%) were associated with reactive thrombocytosis which ranged from 4,40,000 - 11,89,000.

Discussion

Anemia is defined as a reduction of the total circulating red cell mass below normal limits. Functionally, it is defined as the decrease in the oxygen-carrying capacity of the blood, which leads to tissue hypoxia[11].

Anemia is a common clinical presentation in pediatric patients as they are more vulnerable group. The most common clinical presentation are of pallor, failure to thrive and non specific symptoms irrespective of cause.

The etiology of anemia in children can be varied from poverty to self limiting diseases and malignancies leading secondarily to anemia.

In developing countries like India the prevalence of anemia is more and found to be 89 million[12] in preschool children.

In the latest National Representative survey of India[13], 6 – 59 months age group children are found to 70% anemic. Among them 3% are severely anemic, 40% are moderately anemic, 26% mildly anemic respectively.

Among the various types of anemia, Iron deficiency anemia is most common and is due to nutritional deficiency.

As the frequency of anemia is more in children and majority are due to treatable and preventable causes, hence we took this study to determine the prevalence of anemia and associated factors in children at our tertiary care centre. Hence appropriate screening and subsequent early diagnosis and prevention will help in effective timely management of different types of anemia.

A total of 500 cases with anemia between the age group of 5 years to 14 years have been studied for 2 years from 2019 to 2021 **.**

In our study majority of the cases belong to 5 – 8 years(43.6%) and was found female preponderance(52.4%). The prevalence of anemia in regard to gender with age showed statistical significance of p < 0.005.

These findings were comparable with other studies done by Ritu[14] et al and Sudhagandhi[15] et al respectively. In a study done by Marken P et al male preponderance (58%) was noted[16].

Pallor,[17,18,19,20] weakness and fatigability[17,18,19,20] was the most common sign 62.4% (312) and symptom 20%(100) in our study.

Among 500 cases, 210 (42%) cases were of severely anemic (Grade III), 192 were moderately anemic and 97 were mildly anemic respectively. Similar findings were observed by Choudhary P[20] and Janjale et al[21]. In a study done by Venkatesh G et al included 9124 patients of which anemia was found in 7412 (81.2%) and severe anemia in 202 patients, prevalence of severe anemia being 2.2%[22].

Out of 500 cases, the most common morphological type of anemia was Microcytic hypochromic anemia

ie 342 (68.4%) followed by Normocytic hypochromic anemia 127 (25.4%), Dimorphic anemia 18 (3.6%), 12 cases (2.4%) had Normocytic normochromic blood picture and 1 was Sickle thalassemia. Similar observations were found in other series[17,19,20].

Statistical significance (p<0.005) was noted with gender and morphological types of anemia but there was no statistical significance found with age and morphological type of anemia.

In present study RBC indices well correlated with all morphological type of anemia.

In Microcytic hypochromic anemia all RBC indices are decreased and RDW is increased whereas in Dimorphic anemia PCV decreased, MCV and MCH are increased, MCHC decreased. Similar findings were found in a study done by Ramana Sastry et al[18]. 74 cases of Microcytic hypochromic anemia showed leukocytosis in our study which was correlating with a study done by Samanta et al[24] where TLC is insignificantly higher in anemic subjects and among 74 cases, 28 cases presented with neutrophilia and clinically they presented with fever.

Out of 342 cases of Microcytic hypochromic anemia, 83 cases were associated with reactive thrombocytosis. Similar findings were reported in other series[25,26].

The prevalence of anemia in 5 – 14 years age group in our study during December 2019 to June 2021 was found to be 18% whereas in studies done by Tariku et al[23], Ritu et al[14] was found 37.3% and 32.21% respectively.

Conclusion

1. Nutritional deficiency anemia is the most common cause of anemia among children aged 5-14 years & majority had moderate to severe anemia, which was found predominantly in females.
2. Complete blood count and Peripheral smear examination plays a major role in underlying etiopathological diagnosis of anemia which will guide for further ancillary studies and management.
3. Our study recommends that high prevalence of moderate & severe anemia demands emphasis to bring down anemia in 5 – 14 years of age group.

4. Efforts have to be done to reduce maternal anemia, as they indirectly decline anemia in children by sensitising all the mothers which further aid in early detection.
5. Early diagnosis will aid in effective management as well as it declines the morbidity due to anaemia in children.
6. Preventive measures like periodical screening for anaemia has to be implemented particularly in preschool as well as in school age group as it causes delay in psychomotor development.

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