

Study of Prevalence of Anaemia and Haematological Parameters in Children of Maharashtra below 12 years

Shruti Saraf¹, Parveen Kavathekar²

¹Assistant Professor, Department of Biochemistry, Pravara Institute of Medical Sciences, Loni Maharashtra, ²Assistant Professor, Department of Biochemistry, Government Medical College Aurangabad, Aurangabad, Maharashtra.

How to cite this article: Shruti Saraf, Parveen Kavathekar. Study of Prevalence of Anaemia and Haematological Parameters in Children of Maharashtra below 12 years. Indian Journal of Public Health Research and Development 2023;14(2).

Abstract

Background: Anaemia is a widespread public health problem associated with increase risk of morbidity and mortality especially in children and women of reproductive age.

Method: 120 children below 12 years of age suffering with anaemia were studied. The blood examination was done to rule out PCV, MCV, MCH, MCHC, RPW, Hb% PS study, reticulocyte count and serum Iron (Fe), serum B₁₂ and folic acids.

Results: 65 (54.1%) had Iron deficiency, 17 (14.1%) had Thalassemia, 13 (10.8%) had Megaloblast anaemia, 12 (10%) anaemia of acute haemorrhage, 7 (5.83%) had sickle cell anaemia, 4 (3.33%) had Aplastic anaemia, 2 (1.66%) had leukaemia. Clinical manifestation included mainly pallor 120 (100%), 103 (85.8%) weakness and fatigability 42 (35%) fever, 29 (24%) had IC term, 24 (20%) shortness of breathing, 21 (27.5%) hepatomegaly, 15 (12.5%) history of pica, 23 (19.1%) had mild, 59 (49.1%) had moderate, 38 (31.6%) had severe anaemia on the basis of haemoglobin level profile.

Conclusion: Iron deficiency is the major cause of anaemia followed by thalassemia, megaloblastic, acute haemorrhagic sickle cell, aplastic anaemia. This pragmatic study in children certainly helps the nutrition expert and paediatrician to treat such children efficiently to avoid morbidity and mortality.

Keywords: Hb%, Iron deficiency, Sohil's method, Serum Fe, B12 Folic acid

Introduction

Anaemia is the most common nutritional deficiency disorder globally, affecting the under developed countries including India especially children and women of reproductive age group ⁽¹⁾. 1.62 billion people globally and 447 million people in

India suffering with anaemia ⁽²⁾. Highest prevalence of anaemia is observed in pre-school children below 5 years to 12 years is 20% in industrialised and 39% in non-industrialised countries ⁽³⁾.

Anaemia is defined as the condition in which there is less than normal level of haemoglobin

Corresponding Author: Parveen Kavathekar, Assistant Professor, Department of Biochemistry, Government Medical College Aurangabad, Aurangabad, Maharashtra-431001.

E-mail: shrutinurkar@gmail.com

Cell No: +919769116901

(Hb%) in the body, which decreases oxygen carrying capacity Anaemic is diagnosed on the basis of Hb level according to age and gender. Majority of anaemic causes are due to Iron deficient. Iron deficiency generally develops slowly and is not clinically apparent until anaemia is severe even though functional consequences already exist. Iron deficiency impairs the cognitive development of children from infancy through adolescence. Sickle cell anaemia is the most common single gene disorder resulting in haemolytic anaemia ⁽⁴⁾. Folic acid deficiency, Vit 12 deficiency or may be combination of these factors, which can present with dimorphic picture. Aplastic anaemia is due to blood loss and anaemia of chronic disease ⁽⁵⁾. Hence attempt is made to evaluate the causes types and clinical manifestations in children below years of both sexes.

Material and Method

120 (one hundred twenty) children below 12 years regularly visiting to Pravara Institute of Medical Sciences hospital Loni, Maharashtra-413736 were studied.

Inclusive Criteria: Children aged between 6 months to 12 years with pallor clinically diagnosed as anaemia were selected for study.

Exclusion Criteria: Children more than 12 years less than 6 months, children with congenital heart disease, immune compromised, tuberculosis, were excluded from study.

Method

Routine blood examination for anaemia was morphologically based on peripheral findings all volume (PCV). Mean corpuscular volume (MCV), Mean corpuscular haemoglobin (MCH), Mean corpuscular haemoglobin Concentration (MCHC), and red cell distribution by (RDW), were determined by automated cell counter haemoglobin was estimated by sahil's method and expressed in gm% Ps (peripheral smear) was stained by Leishman's

stain. Reticulocyte count was done by Brilliant crystal stain method. Serum Iron determination was done by Romany's dipyriddy method. Total iron method binding capacity was determined by Ramsay'e method, serum vitamin 12 and folic acid was determined by architect method.

The duration of study was from August-2021 to August-2022

Statistical analysis: Various parameters concerned with anaemia, clinical manifestation were classified with percentage. The statistical analysis was carried out in SPSS software. The ratio of male and female was 2:1.

Observation and Results

Table-1: Age wise distribution of patients of anaemia - 18 (15%) were 6 months to 1 years, 55 (45.8%) were aged between 1 to 5 years, 32 (26.6%) were between 6 to 9 years of age and 15 (12.5%) were 10 to 12 years.

Table-2: Prevalence of different Types of anaemia - 65 (54.1%) had Iron deficiency, 17 (14 %) had thalassemia, 13 (10.8%) had megaloblastic anaemia, 12 (10%) had anaemia of acute haemorrhage, 7 (5.83%) had sickle cell anaemia, 4 (3.33%) had Aplastic anaemia, 2 (1.66%) had leukaemia.

Table-3: Clinical manifestation of Anaemic patients - 120 (100%) had pallor, 103 (85.8%) had weakness and fatigability, 42 (35%) had fever, 29 (24.1%) had Icterus, 24 (20%) had shortness of breathing, 21 (17.5%) had hepatomegaly, 16 (13.3%) had cough, 15 (12.5%) had history of pica, 14 (11.6%) splenomegaly, 12 (10%) had petechiae, 9 (7.5%) had vomiting, 10 (8.33%) had kiloychia, 6 (5%) had hyper pigmentation, 8 (6.6%) had tremors.

Table-4: Graders of Anaemia on the basis haemoglobin level 23 (19.1%) had mild anaemia, 59 (49.1%) had moderate, 38 (31.6%) had severe anaemia.

Table 1: Age wise distribution of patients of anaemic

Age in years	No. of Patients (120)	Percentage (%)
6 months to 1 year	18	15
1 to 5 years	55	45.8
6 to 9 years	32	26.6
10 to 12 years	15	12.5

Table 2: Prevalence of different types of Anaemia

Types of Anaemia	No. of Patients	Percentage (%)
Iron deficiency	65	54.1
Thalassemia	17	14.1
Megaloblastic Anaemia	13	10.8
Anaemia of acute haemorrhage	12	10
Sickle cell anaemia	7	5.83
Aplastic Anaemia	4	3.33
Leukaemia	2	1.66

Table 3: Clinical Manifestations of Anaemia Patients

Clinical Manifestation	No. of Patients	Percentage (%)
Pallor	120	100
Weakness and fatigability	103	85.8
Fever	42	35
Icterus	29	24.1
Shortness of Breathing	24	20
Hepatomegaly	21	17.5
Cough	16	13.3
History of Pica	15	12.5
Splenomegaly	14	11.6
Petechiae	12	10
Vomiting	9	7.5
Koilonychia	10	8.33
Hyper pigmentation	6	5
Tremors	8	6.6

Table 4: Grades of Anaemia on the basis of haemoglobin level

Grades of Anaemia	Male	Female	Total	Percentage %
Mild	16	7	23	19.1
Moderate	36	23	59	49.1
Severe	27	11	38	31.6
Total	79	41	120	99.8

Discussion

The present study of prevalence of anaemia and haematological parameters in children of Maharashtra below 12 years 18 (13%) were between 6 months to 1 year, 55 (45.8%) were aged between 1 to 5 years, 32 (26.6%) were aged between 6 to 9 years, 15 (12.5%) were aged between 10 to 12 years (Table-1). 65 (54.1%) had Iron deficiency anaemia, 17 (14.11%) had Thalassemia, 13 (10.8%) had megalblastic anaemia, 12 (10%) had anaemia of acute haemorrhage, 7

(5.83%) had sickle cell anaemia, 4 (3.33%) had aplastic anaemia, 2 (1.66%) had leukaemia (Table-2). Clinical manifestation included 120 (100%) pallor, 103 (85.8%) weakness and fatigability, 42 (35%) fever, 29 (24.1%) had Icterus, 24 (20%) shortness of breathing, 21 (17.5%) hepatomegaly, 16 (13.3%) cough, 15 (12.5%) history of pica, 14 (11.6%) splenomegaly, 12 (10%) had petechiae, 9 (7.5%) had vomiting, 10 (8.33%) had Kiloychia, 6 (5%) had hyper pigmentation, 8 (6.6%) had Tremors (Table-3). 23 (19.1%) had mild anaemic,

59 (49.1%) had moderate, 38 (31.6%) had severe anaemia on the basis of haemoglobin levels (Table-4). These findings are more or less in agreement with previous studies ⁽⁶⁾⁽⁷⁾⁽⁸⁾.

Characterising the symptoms helps to elucidate the severity and chronicity of anaemia and may identify the patients with blood loss or haemolytic aetiologies. Common symptoms of anaemia include lethargy tachycardia and pallor ⁽⁹⁾. Infants with anaemia may present irritability and poor oral intake, changes in urine colour, sclera, icterus or jaundice may indicate the presence of haemolytic disorders such as G6PD (glucose 6-phosphatase dehydrogenase) deficiency. Bleeding from GIT (gastro-intestinal tract) includes changes in stool colour, identification of blood in stool, history if blood symptoms must be reviewed. Severe or chronic epistaxis also may result in anaemia from blood loss and Iron deficiency.

Previous medical history also plays vital role to find out the cause of anaemia in children gestational age, duration of birth, hospitalisation and history of Jaundice and / or anaemia in the new born period Travel to / from endemic infection (E.g. Malaria, hepatitis, tuberculosis) should also be ruled out to evaluate the cause of anaemia. Moreover herbal or oxidant drugs may cause haemolysis particularly in patients with G6PD, possible environmental toxins exposure should be explored including lead exposure and nitrates in well water, family history of inherited haemolytic anaemia ⁽¹⁰⁾.

Anaemia with high absolute reticulocyte count (ARC) reflects an increased erythropoietic response haemolysis or blood. Anaemia with low or normal ARC reflects deficient production of RBC (i.e., reduced bone marrow response to anaemia). However haemolysis or blood loss can be associated with low or concurrent disorder that impairs RBC production. In some cases reticulocyte counts depends in the phase of illness ⁽¹¹⁾.

Review of peripheral smear (PS) is an essential part of anaemia evaluation. Even patients RBC indices are normal review. The blood smear may reveal abnormal cells that can help to identify the cause of anaemia.

The diagnosis approach of anaemia includes pancytopenia in leukaemia, thrombocytopenia

indicateshaemolytic uremic syndrome and thrombocytosis in Iron deficiency, and Leukocytosis in elevated WBC count include leukaemia and infection.

Summary and Conclusion

The present study of anaemia in children below 12 years mainly related to malnutrition in pregnancy and in infancies period of child. Prevalence of high lymphocyte count in anaemia indicates viral infection. The prevalence of anaemia was higher in lower age group; it is due to the frequent infections. Girls of pre-school age had a probable Iron, Vitamin B12 or foliate deficiency as indicated by high ROW (Red Cells distribution Width) values. Girls of adolescent age (11-12 years) were more anaemic indicating more nutritional requirement with onset of puberty overall children below 12 years boyswere found to be suffering from higher level of hypochromasia and microcytic anaemia. The present study recommends about pure water, sanitation and nutritional counselling to the parents having low social economic status moreover nutritional status of pregnancy will have significant impact on infancy and later stage of childhood too.

Limitation of study - Owing to tertiary location of research institution, small number of patients lack of latest techniques we have limited findings and results.

- **This research paper was approved by EthicalCommittee of Pravara Institute of Medical Sciences Loni Maharashtra-413736.**
- **No Conflict of Interest**
- **No Funding**

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