

Frequency of Iron Deficiency Anemia in Children: Cross-sectional survey of outpatients at Akhtar Saeed Trust Teaching Hospital, Lahore from 2016-17

ITAAT ULLAH KHAN AFRIDI¹, HUMA AFRIDI², BEENISH RIAZ³, GHAZANFAR ALI SHEIKH⁴

ABSTRACT

Background: There are many significant problems which occur secondary to IDA (Iron deficiency anemia) like growth failure, depressed immune tolerance, and brain hypoxia and hence headache, overall decreased oxygen carrying capacity will lead to feeling of tiredness and feeling of unwell and irritability.

Aim: To calculate the frequency of deficiency in children regarding iron. In this research we included 1000 kids, male and female.

Methods: The blood samples taken in EDTA (Ethylenediaminetetra acetic acid) tubes. Complete blood count with differential obtained. Deficiency of Fe (iron) in serum and capacity of receptors to bind Fe was determined by having TIBC. Total percentage recorded for children with iron deficiency anemia was 33.90%. Percentage turned out more in females (39.2%) as compared to males (30.7%). Frequency of iron deficiency was more in kids belonging to low earning parents (39.16%), as compared to kids belonging to moderately earning parents (27.46%) and parents having high income (13.15%). Frequency of anemia was more in kids in between 9 and 11 yr (years) (41.45%). Pallor was the most prominent clinical finding.

Conclusion: In this cross-sectional survey of pale children (0.4-11 years) those diagnosed with anemia were one third with average Hemoglobin level of around 10mg/dL and anemia was more in girls, age group of 9 to 11 years and in children of lower class parents. Half of these anemic presented with pallor followed by weakness, fatigue and pale conjunctiva.

Keywords: Fe, Pallor, Complete blood count.

INTRODUCTION

If there is age wise decrease in oxygen caring capacity of blood due to low hemoglobin this is known as anemia there are many reasons for this like decrease in vitamin B12 or Folic acid blood levels but the top most reason for this in paediatric population is decrease Fe. Although now a days much research on this topic has been done and regular screening is going on in developed countries but all over the world still kids are deficient in Fe¹.

IDA is the top most and treatable cause of low hemoglobin levels in kids and adults all over the world especially non developed countries. There is huge number of persons all over the world having this deficiency². World Health Organization reporting 1/2 of these persons are having low Fe as a cause of low hemoglobin. According to estimate forty three percent of kids are having low iron all over the world, majority of them are in between their first and second

birthdays. For our country estimated percentage for Fe deficiency in kids is sixty five but some estimated up to seventy and seventy eight^{3,4,5,6,7}.

IDA is the leading cause of decreased weight and height, low intelligence quotient has and as these children are hypoxic hence do not take part in sports. IDA is strongly associated with increasing death rate in children below one year.⁹ In our country low quality food containing little amount of iron, folic acid and vitamins is a major cause of IDA. There are other causes of iron deficiency in kids and adults like helminth infection, occult gastrointestinal bleeding¹⁰.

Still in Pakistan exact frequency of IDA is not known for many areas and reasons for this deficiency are not well studied so that a national plan to investigate and treat this preventable condition may be made, we conducted this research so that first of all we should be knowing the severity of condition that is frequency of iron deficiency anemia and can make plan who, when and how we can investigate and then treat¹⁰.

Huge number of kids and females are having IDA all over the world especially underdeveloped world. Many kids upto two years of age have only iron deficiency, but seven Lac kids have IDA in first

¹Associate Prof. & HOD Paediatrics, Department of Paediatrics, Nawaz Sharif Medical College, UOG, Gujrat

²Assistant Prof. Obs & Gynae Nawaz Sharif Medical College Gujrat

³Sr Registrar, Obs & Gynae, Shifa International Hosp Islamabad

⁴Prof of Paediatrics, AMDC, Lahore

Correspondence to Dr Itaat Ullah Khan Afridi E- mail: itaatafridi@yahoo.com Cell: 03214253314, 0331 9624483

two years of life⁹. IDA leads to microcytosis and macrocytosis is due to deficiency of folate and cobalamine⁹. Anemia may result from helminth infection and occult blood loss in stool¹⁰.

The objective of the study was to determine the frequency of IDA in kids at Akhtar Saeed Trust Teaching Hospital from 2016 to 2017.

MATERIAL AND METHODS

A cross sectional survey was conducted from 2016 - 2017 at Akhtar Saeed Trust Teaching Hospital Lahore Pakistan. Although we examined daily almost 150 children but we included in the study only those who were clinically pale and signed an informed consent. A total of 1000 children (0.4 - 11 years) from both male and female kids having pallor were included. General physical and systemic examination done along with thorough history at Akhtar Saeed Trust Teaching hospital Lahore Pakistan. Serum samples obtained for these pale children. To obtain hematologic samples under aseptic measures butterfly needles were used and two to three cc of blood taken into CBC vials labeled and transported to our Lab. Samples were drawn from brachial vein. Complete blood count with differential and were obtained. Deficiency of Fe in serum and capacity of receptors to bind Fe was determined by having TIBC.

Proforma designed to document monthly income of parents, gender of kids, intake of iron containing diet and medications and diet that interfere with Fe absorption and intake of Fe containing syrups. We made three classes of kids depended upon per month salary of parents, We placed them, kids belonging to low income parents if earning less than sixteen thousand per month, moderate income if earning twenty five to thirty five thousand and high income if earning more than thirty five thousand per month. World Health Organization criteria for hemoglobin defining anemia was incorporated i.e., hemoglobin less than eleven gram per liter. The child whose hemoglobin level turned out in the range of anemia peripheral blood film done for that. Decrease in mean corpuscular volume and hypochromic red blood cells along with decrease in Fe level in blood and high value for TIBC is sufficient to say IDA.

Statistical analyzing procedure:: All data was analyzed using SPSS version 22. Mean and standard deviation for descriptive statistics were calculated for quantitative data. Frequencies and percentages were calculated for variable i.e. anemia, symptoms, age groups. Chi – Square was used to determine significance in perinatal mortality between the groups. P value ≤ 0.05 considered significant. The data was stratified for age, and parity to control the effect modifiers.

RESULTS

Among a total of 1000 children (0.4 - 11 years) the kids with anemia (Hb<11 g/dL) turned out 33.9% and non-anemic were 66.1% (Figure). Mean \pm sd hemoglobin level children with anemia was 10.6 \pm 2. Female kids were more anemic as compared to male kids. 39.42% female kids were anemic as compared to male child who were 30.76% anemic (see table 1 below). 09-11 years age group percentage of anemic was more (41.09%) as compared to rest. The percentages of anemic kids were 33.33% for 0.4-4.9 year, 31% for 5 – 6.9 years, 28.88% for 7 – 9 years. Kids in between ages (0.5-4.9) have average hemoglobin 9.1, kids between 5 – 6.9 yr age group had 10.5, kids between 7 - 9 yr level was 10.0, kids between 9 - 11 yr had 9.4 average hemoglobin level (see table 2 below). Kids of low income parents kids had highest percentage (39.16%) in having IDA. Kids of moderate income parents kids had stood second in having IDA percentage (27.46%). Kids of high income parents kids stood third in having IDA percentage (13.15%) The frequency of IDA was higher in low income parents kids as these kids were not having proper iron rich food (see table 3 below). Out of all 47.94% patients presented with pallor while 32.94% were having symptoms of lethargy. Fatigue and pale conjunctival Pallor were present in 18.52% and 3.52% of patients respectively (Table 4).

Fig. Frequency of Anemia in the children 0.4 to 11 years of age who presented with Pallor (n=1000)

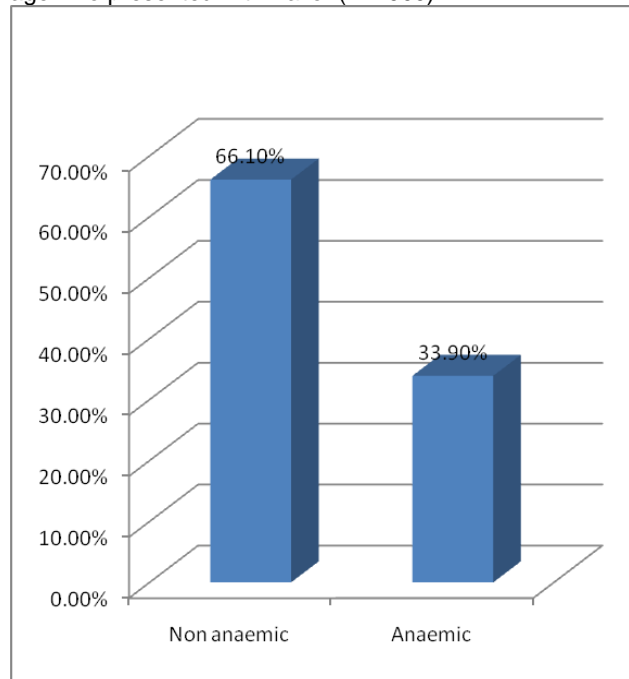


Table 1 : Percentage of IDA according to sex

Gender	Normal Hb level	Anemic (Hb < 11.5 g/dL)	Total
Male kid	450 (69.23), 660 (69.2)	200 (30.76)	650
Female kid	212 (60.57)	138 (39.42)	350

Table 2: Age wise distribution of anemic kids

Distribution of chronological age	Appropriate Hb level	Having IDA Hb <11.0 g/dL)	Average hemoglobin ± SD	Sample Size
0.0.4-4.9	200 (66.66%)	100 (33.3%)	9.1 ± 1	300
5 – 6.9	138 (69%)	62 (31%)	10.6 ± 1.01	200
7 – 9	160 (71.11%)	65 (28.88%)	10.02 ± 1.15	225
9 – 11	159 (57.81%)	114 (41.45%)	9.5 ± 1.32	275
Total	661 (66.1%)	339 (33.9%)		1000

Table 3: Distribution of anemia according to income of parents (n=1000)

Monthly Income Classes	Appropriate Hb n (%)	IDA (Hb < 11.0 g/dL) n (%)	Total
Low< 15,000	365 (60.83)	235 (39.16)	600
Moderate = 15,000 up to 20,000	235 (72.53)	89(27.46)	324
High > 20,000	66 (86.84)	10(13.15)	76
Total	660 (66)	340 (34)	1000

Table 4: Clinical presentations in kids having IDA

Clinical presentation	Anemia (Hb < 11.0 g/dL)	%age
Pallor	163	47.94
Lathergy	112	32.94
Fatigue	63	18.52
Conjunctival Pallor	12	3.52
Total	340	100

DISCUSSION

One thousand children of age range 0.4 - 11 years, male and female kids presented in OPD of Akhtar Saeed Teaching Hospital included. IDA frequency is most common in kids and females with pregnancy in under developed world. The percentage of anemia in children of both sexes (age 0.4-11 years) was 33.9% in children examined in Akhtar Saeed Trust Teaching Hospital Lahore. The anemia percentage in this age was high because the children require nutritional diet for rapid growth. The prevalence of iron deficiency anemia in children of China was 32.5%¹¹. Our country research shows 62.9% in year 1990 below five years of age. In one study for Province Punjab this was 51.5%⁸. Our study showing less children are affected.⁸The lower frequency in our study may be due to earlier diagnosis or this may be due to early treatment or dietary habits also it should be kept in mind that older researches done 26 years back but our results are close to Zhu YP, Liao QK study in China.¹¹

In our study female kids were more affected (39.2%) then male kids (30.7%), this difference may be due to cultural reason because male kids preferably get more nutritious food. Similar results for IDA deficiency i.e 51.1% were found in India in 1998

& 2007^{12,13} female kids having IDA (15.3%) and male kids (12.0%). IDA turned out to be the commonest¹⁴.

41.09 kids having age in between 9-11 yrs were having IDA which was highest among others (5–6.9 years) 3 % because at this age the kids needs more energetic diet with lot of nutrients to grow. In our country Irfan Ullah et al¹⁵ observed same in 2014.

In our study frequency of IDA was high 39.16% in kids of parents with low income. The incidence of anemia was high in lower class (39.16%) as compared to kids of moderate income (27.46%) and high income (13.15%). Same results observed in 2014 in our country previously¹⁵ also similar findings were present in a study carried out in Mexico and by Jain.^{16,14} showing more anemic kids belonging to low income parents and less belonging to high income parents. As less iron containing balanced diet is associated with iron deficiency anemia.^{17,18} Reports are present showing iron deficient mothers may give birth to iron deficient baby¹⁹. Menarche and adolescent pregnancy is a significant cause of IDA²⁰.

Regarding signs and symptoms of anemia, Pallor was the most common presentation in 47.94% children followed by lethargy in 32.94%. Fatigue and conjunctival pallor was observed in 18.52% and 3.52% kids respectively. Same percentages were present in a study conducted previously in Pakistan¹⁵ and are well known presentations of anemia²⁰.

CONCLUSION

In this hospital based cross-sectional survey of pale children (0.4 - 11 years) those diagnosed with anemia were one third with average Hemoglobin level of around 10 mg/dL and more in girls, age group of 9 to 11 years and children of lower class parents. Half of them presented with pallor followed by weakness, fatigue and pale conjunctiva.

Suggestions: Diagnosis of iron deficiency anemia is simple. Routine screening using hemoglobin or hematocrit be done at 12 mo of age and onward when needed.

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