

Prevalence of Anaemia in Children Under 12 Years: A One Year Study in a Tertiary Care Hospital, Lahore

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ABSTRACT

Background: Anemia is a nutritional problem of worldwide importance. It is estimated that at least one-third of the population has been at one time anemic. Most of the anemia is attributed to the iron deficiency. Anemia is a global public health problem related with an increased risk of morbidity and mortality particularly in young children.

Aim: To find out the prevalence of anemia in pediatric population under the age of 12 years during one-year study in a tertiary care hospital, Lahore.

Place of study: Fatima Memorial Hospital, Shadman, Lahore, from May 2015 to April 2016.

Methods: A total of 8922 children of age 1 to 12 years and of both genders were included in this study. The data was extracted from the database of the clinical laboratories of Fatima Memorial Hospital, Lahore. In the study, age, gender and hemoglobin concentration were analyzed and prevalence was calculated.

Results: Out of 8922 children, 4907 (54.8%) were females and 4015 (45.2%) were males. Age group 1-3 years old was the most affected group followed by the group having 4-6 years, seven to nine years and ten to twelve years. Female children are more affected than male children. Severe anemia was more prevalent in age group one to three years of age followed by the group having ages four to six years, seven to nine years and ten to twelve years. Moderate anemia was most common seen in age group 7-9 years old children followed by the group 1-3 years, 4-6 years and 10-12 years.

Conclusion: The present study shows that anemia is a major health problem among children less than 12 years of age.

Keywords: Anemia, iron, hemoglobin, Prevalence, child health, Lahore.

INTRODUCTION

Anemia is a global problem which occurs at all stages of life cycle, such as young children under 12 years of age, adult girls and pregnant women. It affects not only developing countries but also developed countries with major effect on health, social and economical status¹. A large segment of world population is affected by anemia. Global prevalence of anemia is estimated to be about 30% and almost 51% of the young children are affected due to anaemia⁴.

In Pakistan nutritional anemia has been recognized to be the most common type of malnutrition present in children. According to the 1977 micronutrient survey of Pakistan, about 38% of the population was identified to be anemic⁶ According to 1988 National Nutrition Survey of Pakistan 65% of the children aged 7-60 months were found to be anemic⁷. Numerous studies have shown prevalence of anemia between 22-94% as the methodology and criteria for diagnosing anemia has been variable⁸. In a separate study by Jalil and Khan. 83% of the children between 1-5 years of age were found to

suffer from iron deficiency anemia⁹.

The causes of anemia have a huge list which most of the time coexist. Among these causes the most important global cause is iron deficiency which contributes almost 50% of all cases of anemia^{2,3}. The proportion might be variable in various population and in different areas which depends on the local conditions. The main risk factors which contribute for the development iron deficiency anemia includes a decrease iron intake, poor dietary absorption of iron from diets, and situations when iron requirements are highly required e.g., growth and pregnancy. Few other causes such as, parasitic infestations (hookworms, ascaris, schistosomiasis) and heavy blood loss due to menstruation can lower hemoglobin concentrations. Infections (Acute and chronic), such as malaria, cancer, TB, and HIV can also lower blood Hb concentrations³.

Anemia as a general is a sign of poor health which can finally lead to the most drastic effects such as increased maternal and child mortality⁵. At the population level, Hb concentration is the most reliable indicator of diagnosing anemia, whereas, clinical judgment is more prone to errors. Measuring Hb concentration is relatively easy and inexpensive.

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The main aim and objective of this study is to inform the ruling authorities and think tank to reduce the maternal and child mortality rate in Pakistan by preventing and controlling anemia and what measures to be taken at the right time. In addition, special attention to be given on the cause of the anemia which may vary from region to region.

MATERIAL AND METHODS

A total of 8922 children of age 1 to 12 years and of both genders were included in this study. The data was extracted from the database of the clinical laboratories of Fatima Memorial Hospital, Lahore. In the study, age, gender and hemoglobin concentration were analyzed. Anemia was diagnosed by estimating the hemoglobin concentration in the blood with the use of an auto-analyzer called Sysmex.HO Hemoglobin levels reference were used to classify the anemia accordingly. A hemoglobin concentration of less than 11mg/dl was considered to be indicative of anemia.¹⁹The children were grouped under different grades of anemia by adopting WHO guidelines.¹⁰Severe anemia was found to be present in children having a hemoglobin concentration of less than 8mg/dl. Moderate anemia was diagnosed among children with hemoglobin between 8-10mg/dl. While a hemoglobin concentration between 10-12mg/dl was found to be indicative of mild anemia (Table.1)¹¹.

RESULTS

8922 children were included in this study, out of which 4907(54.8%)were females and 4015 (45.2%) were males(Table.2). The group with ages one to three years, four to six years, seven to nine years and ten to twelve years were 40.34% (3600), 28.02% (2500), 20.17% (1800) and 11.45% (1022) respectively(Table.3). In age group 1-3 years, 1200 (33.33%) were normal and 2400 (66.66%) were anemic. Age group 4-6 years had 1400 (56%) normal children and 1100 (44%) anemic, whereas, age group 7-9 and 10-12 years were having 1100 (61.1%) and 642 (62.81%) normal with 700 (38.88%) and 380 (37.18%) anemic children, respectively (Table.4). In age group 1-3 years, 722 (30.4%), 1022 (44.4%) and 580(25.2%) children had mild, moderate and severe anemia, respectively. Age group 4-6 years,

695(49.6%), 499(35.64%) and 206(14.7%) had mild, moderate and severe anemia, respectively. Age group 7-9 years had 248(35.5%), 368(52.3%) and 84 (12.2%), mild, moderate and severe anemic children, respectively. The last age group 10-12 years were having 228(60%), 118(31.5%) and 34(8.5%) children with mild, moderate and severe anemia, respectively (Table.5).

Age group 1-3 years old was the most affected group followed by the group having age four to six years, seven to nine years and ten to twelve years. Female children are more affected than male children. Severe anemia was seen more commonly in children having age one to three years followed by the group having age four to six years, seven to nine years and ten to twelve years. Moderate anemia was most commonly seen in age group 7-9 years followed by the group having age one to three years, four to six years and ten to twelve years. Mild anemia was most common seen in age group 10-12 years old children followed by age group four to six years, seven to nine years and one to three years. Eosinophilia was most commonly seen in age group 4-6 years old children 750(53.5%), followed by age group 7-9 years 280(40%), 1-3 years 730(30.6%) and 10-12 years 46(12%) with overall prevalence of 1906(39.43%) children (Table.6).This could be due to intestinal helmenthiasis especially ascariasis/ hookworm infestation.

Table.1. WHO Guidelines for Grading Anemia

Severity of Anemia	Hb concentration (g/dl)
Mild Anemia	10-11 mg/dl
Moderate Anemia	8-10 mg/dl
Severe Anemia	< 8 mg/dl

Table.2. Gender-wise Distribution of the Patients

Gender	n	%age
Female	4907	54.8
Male	4015	45.2

Table.3. Age-wise Distribution of the Patients

Age group	n	%age
1-3 years	3600	40.34
4-6 years	2500	28.02
7-9 years	1800	20.17
10-12 years	1022	11.45

Table.4. Prevalence of Anemia

Age group (years)	n	Number of Normal Children	Number of Anemic Children
1-3 years	3600	1200 (33.33%)	2400 (66.66%)
4-6 years	2500	1400 (56.00%)	1100 (44.00%)
7-9 years	1800	1100 (61.10%)	700 (38.88%)
10-12 years	1022	642 (62.81%)	380 (37.18%)

Table 5: Prevalence of different grades of anemia

Age group (years)	Total Anemic Children	Mild Anemic	Moderate Anemic	Severe Anemic
1-3 years	2400	798 (33.25%)	1022 (42.58%)	580 (25.00%)
4-6 years	1100	495 (49.60%)	399 (35.64%)	206 (14.70%)
7-9 years	700	248 (35.50%)	368 (52.30%)	84 (12.20%)
10-12 years	380	228 (60.00%)	118 (31.50%)	34 (8.50%)
Total	4580	1769 (38.62%)	1907 (41.63%)	904 (20.00%)

Table.6. Prevalence of Eosinophilia among anemic children

Age group (years)	Total Anemic Children	Children with Eosinophilia
1-3 years	2400	730 (30.6%)
4-6 years	1100	750 (53.5%)
7-9 years	700	280 (40%)
10-12 years	380	46 (12%)
Total	4580	1806 (39.43%)

Table.7 Comparison with other national and international studies

Studies	Country of Study	No. of Children included in study	Prevalence of anemia	of Eosinophilia
Our study at FMH	Pakistan	8922	51.33% (n=4580)	39.43% (n=1806)
Mandot S et al.	India	1462	83.60% (n=1223)	21.60% (n=260)
Villalpando S et al.	Mexico	8111	50.01% (n=4080)	Not studied
OsorioMMet al.	Global	777	40.90% (n=390)	Not studied
Molla A et al.	Pakistan	391	70.00% (n=273)	Not studied

DISCUSSION

Pediatric anemia is one of the most common problems in the world due to nutritional deficiency today, particularly in third world countries. It is estimated that around 5 billion people are suffering due to iron deficiency anemia and it is very common among infants (6-24 months)^{12,13}. It is also the most important cause of infant morbidity and mortality globally.

45-65% of children (<4 years) are anemic and 50% of them are due to iron deficiency anemia. 30%-70.5% of Pakistani children are reported to be suffering from iron deficiency anemia¹⁷. Our prevalence of 51.33% matches with the available data. Numerous national and international studies have shown that even moderate anemia (Hb<10g/dl) is linked with irreversible decreased mental and motor development in children^{4,15}.

This high prevalence of pediatric anemia (in age group 1-3 years) has a negative impact on their short- and long-term health status such as inability to resist acute infections, short stature, poor school performance, mental retardation and a lower capacity for physical work²⁰.

Eosinophilia was observed in 1806(39.43%) children with 30.6%, 53.5%, 40.6% and 12% in age group 1-3 years, 4-6 years, 7-9 years and 10-12 years old children, respectively. This could be due to intestinal helmenthiasis especially ascariasis/hookworm infestation.

The results of our study were compared with some national and international publication (Table 7) and our data was in concordance with most of them.

CONCLUSION

The present study shows that anemia is a major health problem among children less than 12 years of age. The data we presented proved that pediatric anemia is very high in our setup. We need to take very serious preventive measures and actions to tackle with this problem to prevent children's mental and physical disability.

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