Original Research Paper

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Paediatrics

# A RETROSPECTIVE STUDY OF SEVERE ANEMIA AND ASSOCIATION WITH SYSTEMIC ILLNESS IN AGE GROUP 6 MONTHS TO 12 YEAR IN TERTIARY CARE RURAL HOSPITAL OF MAHARASHTRA.

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**ABSTRACT** **Background-** Anemia is a very common hematological disorder in infancy. Anemia occurring during infancy affects the physical and neurological development of the child. It exposes the infant to the risk of infection which aggravates anemia so that there is a vicious cycle of anemia > infection > anemia. Anemia reduces the immunity of baby and leads to infection. Infection in turn aggravates anemia and malnutrition. Malnutrition was present in 98% cases. The integrity of mucous membranes and respiratory epithelium is impaired. Thus these babies are prone for infections. This can be prevented if anemia is detected early and treated properly . This Study, was conducted to evaluate how Severe Anemia is associated with other Systemic illness in children Aged between 6 months to 12 years of age. **Material and Methods-**The Retrospective study was conducted in Dr.Vitthalrao Vikhe Patil Pravara Rural Hospital, Loni over a period of two years September 2015 to September 2017. **Results:** Out of total 300 cases of severe anemia, Out of this 40% were male and 60% were female. Girls were more affected as compared to boys.The Bronchopneumonia is the commonest disease present in 128 (42.7%) anemia cases, second commonest is Malaria 42(14%) along with Acute Gastrointestinal in 39(13%) anemia cases , Infantile tremor syndrome is in 21(7%), Congenital heart disease in 18(6%), Pulmonary TB in 16(5.3%) Febrile convulsions in 12(4%), while 9(3%) either had septicemia or other infection and only 6(2%) had meningitis. **Conclusion:** Children with severe anemia have association with systemic illnesses but more prone for Respiratory tract infections. Early detection of symptoms and signs and a combination of nutritional supplementation and food fortification programmes should be done in Anganwadi, Preschool and school going children for supplementation of iron especially in rural areas.

**KEYWORDS :** Hemoglobin, Anemia, Paediatrics, Systemic illness, Bronchopneumonia, Malaria, Infection

## INTRODUCTION

Anemia can also be defined as reduction in the oxygen carrying capacity leading to tissue hypoxia and it is characterized by reduced cell mass and or blood hemoglobin concentration. In normal subject the average life span of red cell is between 100 to 120 days. The cells destroyed each day are replaced by new cells released from the marrow with the result that the red cell population consists of cells ranging in the age from 1 to 120 days. Thus approximately 1% or slightly less of body's red cells are destroyed and replaced each day. Any disruption of this balance such as decreased production or increased destruction leads to anemia. Child is said to be anemic when the hemoglobin and or hematocrit is two standard deviation below the mean for that particular age and sex.

The WHO guidelines of hemoglobin and hematocrit levels below which anemia are present in a population is given as:- Hemoglobin level bellow 7gm/dl is considered severe anemia,7 to 9.9gm/dl moderate and 10 to 10.9gm/dl as mild anemia.

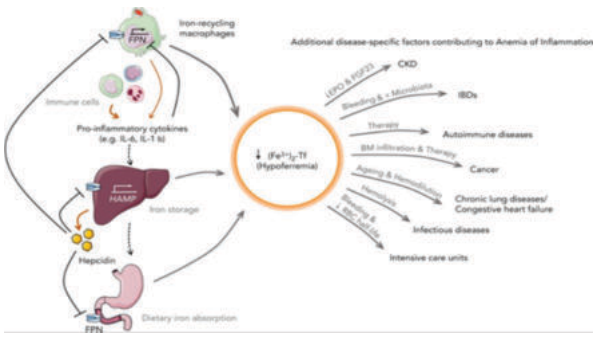
Normal range of hemoglobin for various ages

| Age | Haemoglobin | in (gm/dl) | Hematocrit (%) | |
|---|---|---|---|---|
| | Mean | Range | Mean | Range |
| Cord blood | 16.8 | 13.7-20.1 | 55 | 45-65 |
| 2wks | 16.5 | 13.0-20.0 | 50 | 42-66 |
| 3 months | 12.0 | 9.5-14.5 | 36 | 31-41 |
| 6mo-6Years | 12.0 | 10.5-14.0 | 37 | 33-42 |
| 7 -12Years | 13.0 | 11.0-16 | 38 | 34-40 |

| | ICMR | WHO |
|---|---|---|
| Mild | 10 — 11 gm/dl | 9-11 |
| Moderate | 7-10 | 7 - 9 |
| Severe | 4-7 | <7 |
| Very severe | <4 decompensated | |

Common signs and symptoms of anemia are Progressive pallor, Edema, Tremors , Refusal of feed, failure to thrive, Irritability , Recurrent fever, Delayed development, Pigmentation, vomiting , diarrhoea ,cough ,cold, breathlessness.

The clue to the diagnosis can be obtained by proper history and routine investigations like complete blood count, hemoglobin percentage, peripheral blood smear, blood indices, red cell distribution width, reticulocyte count, osmotic fragility, sickling test, Hb- electrophoresis, etc. and renal function tests, liver function tests. The peripheral blood smear may help to type the anemia on the basis of morphology. It may also have evidence of hemolysis, sepsis etc. The liver function test may be altered with increased bilirubin, in hemolytic anemia. Similarly renal function test and liver function test may be deranged in chronic diseases.




Anemia has adverse affect on children especially in first two years of life such as behavioural delay, reduced cognitive development, low immunity and growth ,weight ,fatigue ,difficulty with concentration ,lethargy ,increased mortality and susceptibility to infection. Anemia exposes the infant to risk of infection with aggravates anemia so that there is a vicious cycle of anemia and infection. Anemia reduces the immunity of baby and leads to infection. Infection in turn aggravates anemia and malnutrition. Malnutrition was present in 98% cases. The integrity of mucous membranes and respiratory epithelium is impaired. Thus these babies are prone for infections. This can be prevented if anemia is detected early and treated properly. This Study was conducted to evaluate how Severe Anemia is associated with other Systemic illness in children Aged between 6 months to 12 years of age.

## METHODS

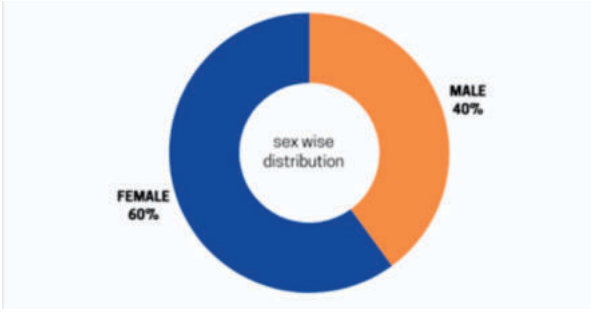
The present retrospective study was conducted in department of Paediatrics, Dr.Vitthalrao Vikhe Patil Pravara Rural hospital Loni,

Maharashtra ,India for a period of 2 years (September 2015 to September 2017).All patients in the age group 6 months to 12 years with haemoglobin.

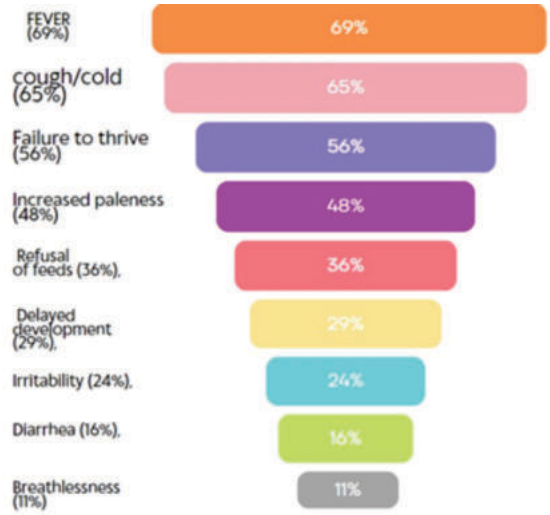
Data collection for this study included a retrospective review of hospital medical records of all children aged 6months to 12 years who were admitted to paediatric ward . Laboratory investigations reports such as complete hemogram, peripheral blood smear , reticulocyte count, osmotic fragility, sickling test, Hb-electrophoresis, etc. and renal function tests, liver function tests were noted.

## RESULTS

A total of 7562 children were admitted to paediatric ward during the study period. As per the diagnostic criteria defined for severe anemia according to hemoglobin level and after fulfilling the inclusion and exclusion criteria ,a total of 300 children were enrolled in the study.

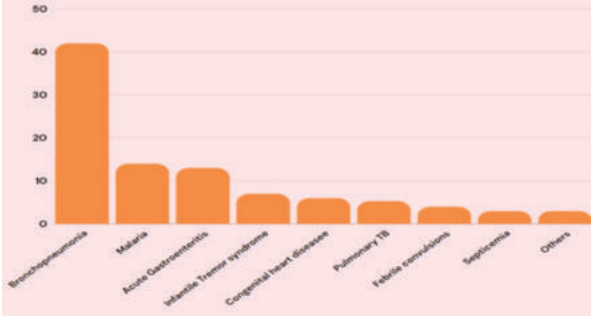



Out of this 40% were male and 60% were female. Girls were more affected as compared to boys.




In the present study fever (69%) was the commonest presenting complaint, followed by cough/cold (65%), failure to thrive (56%), increased paleness (48%), refusal of feeds (36%), delayed development (29%), irritability (24%), diarrhea (16%),breathlessness (11%), and others (pigmentation- 4%, edema- 4%, tremors- 3%).

By applying Z test of difference between two proportions the proportion of symptoms fever, cough/cold, increased paleness and failure to thrive is significantly higher ($p<0.05$)




By applying Z test of difference between two proportions the proportion of Bronchopneumonia is significantly more associated with anemia ($p<0.05$).

The Bronchopneumonia is the commonest disease present in 128(42.7%) anemia cases, second commonest is Malaria 42(14%) along with acute gastrointestinal in 39(13%) anemia cases.

Some disease i.e. Infantle tremor syndrome is in 21(7%), Congenital heart disease in 18(6%), pulmonary TB in 16(5.3%) febrile convulsions in 12(4%), while 9(3%) either had septicemia or other infection and only 6(2%) had meningitis.

## DISCUSSION

Comparison of symptomatology among various studies

| | Bobat R A et la | Choudhary V P, et al | Smolka V et al | Present Study |
|---|---|---|---|---|
| Fever | 28% | 38% | 32% | 69% |
| Cough/Cold | 56% | | - | 65% |
| Breathlessness | | | | 11% |
| Failure To Thrive | | | 58% | 56% |
| Tremors | | | 12% | 9% |
| Pallor | | 89% | | 100% |
| Diarrhea | 43% | | | 16% |

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Choudhary V P, et al in their study of hemolytic anemias found that pallor (89%) was the commonest presenting feature. Fever was present in 38% cases which is significantly less than in present study.

In study by Bobat R A et la and Smolka V et al children were brought for some other complaints and pallor was not the presenting complaint, later they were found to be pale on examination.

Comparison Association Between Anemia And Systemic Illness Among

| Sr. No. | Disease | Ramnath T, Krishna-mchari KA | Levy A, Fraseer D et al | Mora LA, et al | Simsek 0 P et al | Present Study N =300 |
|---|---|---|---|---|---|---|
| 1. | Bronchopneumonia | 39% | 28% | 18% | | 128(42.67%) |
| 2 | Pulmonary tuberculosis | 2% | 1% | | | 16(5.33%) |
| 3. | Acute gastroenteritis | | 34% | 58% | | 39(13%) |
| 4. | Infantile tremor syndrome | 5% | | | 4% | 21(7%) |
| 5. | Meningitis | | 1% | | | 6(2%) |
| 6. | Congenital heart disease | | | | | 18(6%) |
| 7. | Malaria | 3% | | | | 6(14%) |
| 8. | Septicemia | | | | | 9(3%) |
| 9. | Febrile convulsion | | | | | 12(4%) |

We found that infection of the Respiratory tract is commonest with bronchopneumonia present in 128 (42.67%) cases and pulmonary tuberculosis in 16 (5.33%) cases. Next common system involvement was the gastrointestinal system. Presentation was with diarrhea (16%) or and vomiting with various degree of dehydration.

The above observations are consistent with those of Ramnath T et al (39%) who found that anemia, protein energy malnutrition and upper respiratory infections occurred significantly more often as one digressed form normal nutrition grade. PEM and upper respiratory infections were significantly associated with anemia.

Levy A, Fraseer D et al in their prospective study of Anemia as a risk factor for infectious disease in infants and toddlers observed that anemia at 6 months was an independent risk factor for diarrhea after that by age of 2year, risk for diarrhea increased by 9 fold and that of respiratory disease by 2 fold.

Our findings were in contrast to those of Mora LA, et al who observed that diarrhea (58%) was more common than respiratory disease (18%) in patients of anemia.

In our study, Neurological manifestations were seen in form of infantile tremor syndrome (8%), meningitis (2%), apart from development regression or delay. Similarly, Simsek O P et al found neurological development regression, skin pigmentation and tremors in patient of Vit – B12 deficiency.

There were 18 cases of congenital acyanotic heart disease. 42 cases of malaria and 9 cases of septicemia, which was not seen in any other study.

## CONCLUSION

Anemia in children is common preventable health issue. Females are more prone for anemia. fever was the commonest presenting complaint, followed by cough/cold .Anemia reduces the immunity of baby and leads to infection. Infection in turn aggravates anemia and malnutrition. The integrity of mucous membranes and respiratory epithelium is impaired. Infection of the Respiratory tract is commonest. Early detection of symptoms and signs and a combination of nutritional supplementation and food fortification programmes should be done in Anganwadi, Preschool and school going children for supplementation of iron especially in rural areas.

**Conflict of Interest:** We have no conflict of interest
**Funding:** No funding sources
**Ethical Approval:** The study was approved by the Institutional Ethics Committee.

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