ORIGINAL ARTICLE

Assessment of low hemoglobin level as risk factor for acute lower respiratory tract infections in children

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ABSTRACT:
Background: Among all people, hemoglobin (Hb) level is the most accurate measure of anemia. Anemia is a serious public health issue that can affect people at any point in their lives, although it is more common among young children and pregnant women who are iron deficient.The present study was conducted to assess a low hemoglobin level is a risk factor for acute lower respiratory tract infections in children. **Materials & Methods:** 110 children of 1 month to 5 years of age of both genders were selected. Patients (55) were kept in group I and control (55) with no infection in group II. All patients were subjected to detailed history and thorough clinical examination followed by investigations like complete blood count (CBC), peripheral blood film (PBF) smear, blood culture and sensitivity test, X-ray chest, serum iron and iron binding capacity were done in all cases. **Results:** Out of 110 children, males were 60 and females were 50. In group I and group II, symptoms were cough in 54 and 12, fever in 50 and 17, ronchi/crepitations in 32 and 3, chest in-drawing in 18 and 2, pain abdomen in 9 and 4, diarrhea in 5 and 7, vomiting in 8 and 1, convulsions in 12 and 3 respectively. Anemia was seen in 38 and 10 patients respectively. PBF smear anemia microcytic hypochromic in 25 and 6 and normocytic normochromic in 13 and 4 patients in group I and group II respectively. Serum iron levels (mcg/dL) in anemic was 35.7 and 56.2 and in non- anemic was 52.1 and 67.4 respectively. The difference was significant (P< 0.05). **Conclusion:** Anemia, predominantly iron deficiency anemia, was significantly found in ALRTI patients.
Keywords: Anemia, iron deficiency, haemoglobin

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INTRODUCTION

Among all people, hemoglobin (Hb) level is the most accurate measure of anemia. Anemia is a serious public health issue that can affect people at any point in their lives, although it is more common among young children and pregnant women who are iron deficient.[1] In India, more than 75% of children aged 1-3 suffer from anemia, putting them at risk for infections and other anemia-related complications.[2] All infections of the lungs and the airways below the larynx are classified as lower respiratory tract infections (LRTIs), which also includes pneumonia, bronchitis, bronchiolitis, and croup syndromes. In underdeveloped nations, pneumonia, or acute lower respiratory tract infections, is the leading cause of death for children under the age of five.[3] Approximately 150 million bouts of childhood pneumonia are recorded every year from the world and there are about 3 million deaths, less than 5 years of age, each year owing to pneumonia, of these deaths 90-95% are in the developing countries.[4] Many risk factors have been identified that raise the likelihood of developing lower respiratory infections; some are known to occur, some are anticipated to occur, and a small number are hypothetical.[5] Taking control of the risk factors can have a positive impact on children's healthy growth and development, as lower respiratory tract infections are the primary cause of morbidity and mortality in children.[6]The present study was conducted to assess a low hemoglobin level is a risk factor for acute lower respiratory tract infections in children.

MATERIALS & METHODS

The present study was conducted on 110 children of 1 month to 5 years of ageof both genders. All parents were informed regarding the study and their written consent was obtained. Patients having fever, cough, fast respiratory rate for age, chest in-drawing, and ronchi or crepitations on auscultation were considered positive for acute lower respiratory tract infections.
Data such as name, age, gender etc. was recorded. Patients (55) were kept in group I and control (55) with no infection in group II. All patients were subjected to detailed history and thorough clinical examination followed by investigations like complete blood count (CBC), peripheral blood film (PBF) smear, blood culture and sensitivity test, X-ray chest, serum iron and iron binding capacity were done in all cases.Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS
Table I Distribution of patients

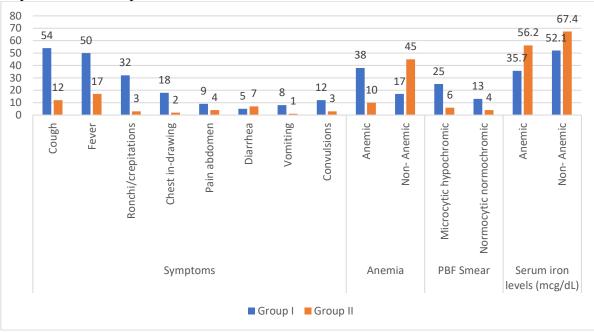| Total- 110		
Gender	**Male**	**Female**
Number	60	55

Table I shows that out of 110 children, males were 60 and females were 50.

Table II Assessment of parameters

Parameters	Variables	Group I	Group II	P value
Symptoms	Cough	54	12	0.05
	Fever	50	17	
	Ronchi/crepitations	32	3	
	Chest in-drawing	18	2	
	Pain abdomen	9	4	
	Diarrhea	5	7	
	Vomiting	8	1	
	Convulsions	12	3	
Anemia	Anemic	38	10	0.02
	Non- Anemic	17	45	
PBF Smear	Microcytic hypochromic	25	6	0.04
	Normocytic normochromic	13	4	
Serum iron levels (mcg/dL)	Anemic	35.7	56.2	0.03
	Non- Anemic	52.1	67.4	

Table II shows that in group I and group II, symptoms were cough in 54 and 12, fever in 50 and 17, ronchi/crepitations in 32 and 3, chest in-drawing in 18 and 2, pain abdomen in 9 and 4, diarrhea in 5 and 7, vomiting in 8 and 1, convulsions in 12 and 3 respectively. Anemia was seen in 38 and 10 patients respectively. PBF smear anemia microcytic hypochromic in 25 and 6 and normocytic normochromic in 13 and 4patientsin group I and group IIrespectively.Serum iron levels (mcg/dL) in anemic was 35.7 and 56.2 and in non- anemic was 52.1 and 67.4respectively.The difference was significant (P< 0.05).

Graph I Assessment of parameters

DISCUSSION
The most prevalent disease influencing people's health, socioeconomic advancement, and general well-being is anemia.[7,8] Iron deficiency in particular is a prominent cause of dietary insufficiency leading to anemia.[9,10] With 616 million individuals at risk, Southeast Asia has the greatest percentage of anemic population worldwide. Impaired physical and cognitive development in children, as well as higher

rates of morbidity and mortality from infections, are among the main health effects.[11]

We found that out of 110 children, males were 60 and females were 50. Mourad et al[12] included a total number of two hundred infants and children aged nine months to twelve years with lower respiratory tract infection. Anemia was found in 32% of hospitalized cases and 16% of healthy controls. Mean hemoglobin level was 9.99 ± 0.62 gram per decilitres and 11.99 ± 0.92 gram per decilitres in anemic and non-anemic group respectively. C-reactive protein levels and number hospitalization days were similar among the anemic and non-anemic group. History of recurrent chest infections was significantly higher in both anemic group and hospitalized cases compared to non-anemic group and healthy controls. Low hemoglobin level was a risk factor for lower respiratory tract infection.

We found that in group I and group II, symptoms were cough in 54 and 12, fever in 50 and 17, ronchi/crepitations in 32 and 3, chest in-drawing in 18 and 2, pain abdomen in 9 and 4, diarrhea in 5 and 7, vomiting in 8 and 1, convulsions in 12 and 3 respectively. Anemia was seen in 38 and 10 patients respectively. PBF smear anemia microcytic hypochromic in 25 and 6 and normocytic normochromic in 13 and 4 patients in group I and group II respectively. Serum iron levels (mcg/dL) in anemic was 35.7 and 56.2 and in non- anemic was 52.1 and 67.4 respectively. Hussain et al[13] in their study had slightly male preponderance 57.3% instudy group and 59.1% in control group. Maximum number ofchildren were between 3 months and 23 months both in thestudy (80.9%) as well as in the control (81.8%) group. In thisstudy hemoglobin level <11 gm/dL was considered low. MeanHb level was 8.8 gm/dL in the study group and 11.6 gm/dL inthe control group. Anemia was found in 71 (64.5%) cases in thestudy group and in 31 (28.2%) cases in the control group. Anemicpatients were found to be 4.6 times more susceptible to ALRTI. Iron deficiencywas found in 78.9% of total anemic cases in the study group. In the study group, the mean serum iron levelwas 35.3 mcg/dL in the anemic cases and 57.1 mcg/dL in thenon-anemic cases. while in the control group, these values were52.4 mcg/dL and 62.6% mcg/dL respectively.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that anemia, predominantly iron deficiency anemia, was significantly found in ALRTI patients.

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