

VITAMIN D LEVELS, IRON LEVELS IN PAEDIATRIC ACUTE LOWER
RESPIRATORY TRACT INFECTION¹Dr. Divya Dhiman and ²*Dr. Twinkle Sood¹Medical Officer Pediatrics, Both Authors are Affiliated with Civil Hospital Palampur.²Medical Officer OBG, Both Authors are Affiliated with Civil Hospital Palampur.

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ABSTRACT

Objectives: To study vit D, Iron levels in patients of acute lower respiratory tract infection and to study the association between vitamin D, iron levels and patients with acute lower respiratory tract infection. **Materials and Methods:** A hospital based observational study was carried out at Civil Hospital Palampur for a period of 6 months. A total of 60 patients between the age group of 2 months to 6 years with history of Acute lower respiratory tract infection were included in the study. Vit D and Iron levels were assessed in these patients. These patients were followed up for 6 months. **Results:** We found that out of 60 cases of acute lower respiratory infections, 38(63.3 %) were males and 22(36.6%) were females. 55% of patients were having vitamin D levels <10 ng/ml, 10 (16.6%) were having vitamin D levels in the range of 10 -20 ng/ml, 17(28.3%) were having vitamin D levels in the range of 20 -60 ng/ml. Out of 60 patients, 44 (73.3%) were having HB < 11 g/dl and 16 (26.6%) were having Hb more than 11 g/dl. Out of 60 patients, 18 (30%) patients were having serum iron level <60 mcg/dl and 42 (70%) were having serum iron levels > 60 mcg/dl. **Conclusion:** Our study showed that Vitamin D deficiency and Iron deficiency anaemia can predispose children for acute lower respiratory tract infections. So Vitamin D and iron supplementation should be considered to prevent respiratory tract infections in children.

INTRODUCTION

Vitamin D is a fat soluble vitamin. The human body produces 90% vit D through exposure to sunlight. The rest of the 5 % of the body's vitamin D supply depends on our diet, specifically food products such as dairy products and fish.^[1] Vitamin D can be synthesized in skin epithelial cells. Cutaneous synthesis is normally the most important source of vitamin D and depends on the conversion of 7 -dehydrocholesterol to vitamin D3 by ultraviolet B radiation from the sun.^[2]

Vitamin D regulates more than 200 genes including genes for cellular proliferation, differentiation and apoptosis.^[3] In respiratory health, vitamin D deficiency has been shown to increase the risk of upper respiratory tract infections and tuberculosis and to decrease the forced expiratory volume in 1 s (FEV1) in asthma and wheezing disorders.^[4]

Respiratory tract infections are among the most frequent diseases in early life. Many viruses are known to be associated with symptomatic respiratory tract infections, the most common being respiratory syncytial virus (RSV), influenza viruses type A and B, parainfluenza viruses, adenoviruses and rhinoviruses.

Respiratory tract infections are common worldwide and are responsible for significant morbidity and mortality.

Acute lower respiratory infection (ALRI) is one of the most common reasons for hospitalization and intensive care unit admission among children.^[5]

The immune system is your body's defense system. Thereby helping children to fighting infections. In children, an association between nutritional rickets with respiratory infection has long been recognized.^[6]

The respiratory epithelium is prone to invasion due to its vast surface area. The cells involved in the defense mechanism in the respiratory system include the airway epithelia, alveolar macrophages and dendritic cells. These cells contain genes, which helps in expressing the vitamin D receptors on the cell surface and produce the enzyme which converts vitamin D into active form. Loss of vitamin D receptors from the surface of these cells causes damage to the integrity of the epithelium.^[7]

Iron has a crucial role in functioning of iron proteins such as hepcidin, lactoferrin, haptoglobin, and transferrin. These proteins help in building up the innate immunity.^[8] Thus, in cases of iron deficiency there is an inadequate immune response and an increased risk of acquiring infection particularly in children < 5 years who are more prone to iron deficiency and thus anaemia.

MATERIALS AND METHODS

A hospital based observational study was carried out in the children selected from Paediatric ward of Civil Hospital Palampur from July 2022 to December 2022. A total of 60 cases of acute lower respiratory tract infection between the age group of 2 month to 60 months were included in the study. Case definition of acute lower respiratory tract infection as given by World health organisation was used for cases.

After taking consent from parents, venous sample was collected for estimation of vit d3 , serum iron and CBC.

Table No -2 Vitamin D levels in various categories.

Category	Level of VIT D	No. Of cases	Percentage
Deficient	< 10 ng/ml	33	55 %
Insufficient	10 -20 ng/ml	10	16.6%
Optimal	20 -60 ng/ml	17	28.3%

Out of 60, 33 (55%) were having vit d levels <10 ng/ml, 10 (16.6%) were having vit d levels in the range of 10 - 20 ng/ml, 17(28.3%) were having vit levels in the range of 20 -60 ng/ml.

Table No. -3: Distribution on the basis of Hb.

Hb levels	No. of cases	Percentage
<11 g/dl	44	73.3%
>11 g/dl	16	26.6%

Out of 60 patients, 44 (73.3%) were having HB < 11 g/dl and 16 (26.6%) were having Hb more than 11 g/dl.

Table No. – 4: Distribution on the basis of serum iron levels.

Serum iron levels	No. of cases	Percentage
<60 mcg/dl	24	40%
>60 mcg/dl	36	60%

Out of 60 patients, 18 (30%) patients were having serum iron level <60 mcg/dl and 42 (70%) were having serum iron levels > 60 mcg/dl.

DISCUSSION

In our study we found that deficient levels of vit D were found in 55% of patients. Studies conducted by Mc Nally et al were found that significantly more children admitted to the paediatric intensive care unit with acute lower respiratory tract infection were vitamin D deficient.^[9] Similarly Esposito et al found that vitamin D deficiency is associated with an increased risk of RTIs and vitamin D for supplementation has been proposed for its prevention.^[10]

In our study we found that HB was less than 11 g/dl (anaemia) in 73 % of patients and serum iron was less than 60mcg in 40% of patients of acute lower respiratory tract infection. A similar study was conducted in Nepal on 200 children of a tertiary hospital in the year 2015.

Inclusion criteria: All cases of Acute lower respiratory tract infection.

Exclusion criteria: 1. Hyperactive airway disease 2. Pulmonary tuberculosis.

RESULTS

Table No -1 Distribution on the basis of gender.

Gender	n =60	Percentage
Male	38	63.3%
Female	22	36.6 %

Out of 60 cases of acute lower respiratory infections, 38(63.3 %) were males and 22(36.6%) were females.

According to this study, a total of 86% of study group were found to have iron deficiency anaemia.^[11] A study done in India on a small sample size did not show a significant statistical relation of iron deficiency anaemia with children presenting with wheeze associated respiratory tract infections.^[12]

CONCLUSION

So our study shows that Vitamin D deficiency and Iron deficiency anaemia can predispose children for acute lower respiratory tract infections. So Vitamin D and iron supplementation should be considered to prevent respiratory tract infections in children.

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