

# Study of Vit D3 Level in Lower Respiratory Tract Infection Patient.

Bela Shah<sup>1</sup>, Dhara Gosai<sup>2</sup>, Nirav Rathod<sup>3</sup>

<sup>1</sup>Professor & Head of unit, B. J. Medical College, Ahmedabad.

<sup>2</sup>Assistant professor, B. J. Medical College, Ahmedabad.

<sup>3</sup>2nd year resident, B. J. Medical College, Ahmedabad.

Received: May 2019

Accepted: May 2019

**Copyright:** © the author(s), publisher. It is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## ABSTRACT

**Background:** Low serum 25-hydroxyvitamin D (25[OH] D) levels have been associated with increased susceptibility to and severity of lower respiratory tract infections. Hypovitaminosis D may be a modifiable risk factor in the severity of lower respiratory illnesses. **Aims and Objective:** The aim is to study the association of vitamin D deficiency with lower respiratory tract infections in children from 1 month to 12 year of age admitted in civil hospital pediatric ward. **Methods:** All patients aged 1 month to 12 years with lower respiratory tract infections admitted as inpatient in the Department of Pediatrics, civil hospital ahmedabad has been tested for serum Vitamin D levels by standard serological test. Informed consent had taken from the parents. All data collected with use of preformed performa. About 3 ml of blood is collected and sent for serum 25 (OH) vitamin D analysis. **Results & Conclusion:** Total 75 patients has been enrolled in this study. Patient from 1 month to 12 years were included. Out of 75 patients, 44 are male child and 31 are female child. Out of 75 patients, 43 patients have sufficient vitamin D level while 21 patient have vitamin D insufficiency and 11 patient have vitamin D deficiency. Vitamin D deficiency and no. of respiratory tract infections were more in male children than female children. Vitamin D levels were low in children who were exclusively breast fed for 6 months (65.6%). Vitamin D levels were low in children who had poor exposure to sunlight (78.1%). There is no significant association between lower respiratory tract infection and vit D3 level.

**Keywords:** VitD3 level, lower respiratory tract infection.

## INTRODUCTION

Vitamin D is a group of fat soluble pro-hormones, the two major forms of which are vitamin D2 (or ergocalciferol) and vitamin D3 (or cholecalciferol). Dietary intakes of both calcium and vitamin D are very low in majority of population except in high socioeconomic groups. Since few foods contain vitamin D, sunlight exposure is the primary determinant of vitamin D status in humans. The main function of vitamin D in the body is to regulate calcium and phosphorous homeostasis, a process essential for bone mineralization. Most of the physiological effects of vitamin D in the body are mediated by its active form 1, 25(OH) vitamin D. It acts through a transcription factor – vitamin D receptor (VDR) which present in the nuclei of target cells

### Risk Factors for Deficiency

**Exclusively breast-fed infants:** Infants who are exclusively breast-fed and do not receive vitamin D supplementation are at high risk of vitamin D deficiency, particularly if they have received little

sun exposure. Inflammatory bowel disease, fat malabsorption syndromes, liver and kidney disorders results in impaired absorption and conversion due to its active form. Vitamin D deficiency causes several bone diseases Osteomalacia, Osteoporosis including Rickets, where the earliest sign of sub clinical vitamin D deficiency is craniotabes, abnormal softening of the skull. Vitamin D malnutrition increases the susceptibility to several chronic diseases such as high blood pressure, peripheral arterial disease and several auto immune diseases including type 1 diabetes, chronic muscle pain and weakness in both children and adults. Vitamin D deficiency increases the risk of respiratory tract infections such as Influenza and Tuberculosis. Expression of antimicrobial peptides, such as cathelicidin, which play an important role in the regulation of the innate immune system, is dependent on vitamin D. It follows that vitamin D insufficiency can interfere with an adequate response to inflammation and infection. Moreover, vitamin D can inhibit inflammatory cytokines that are upregulated during influenza virus infection. Vitamin D is therefore thought to have a role in both preventing and reducing the burden of viral respiratory infections.

### Aims:

To study the incidence of vitamin D level in lower respiratory tract infection.

### Name & Address of Corresponding Author

Dr. Dhara Gosai  
Assistant professor  
B.J. Medical College,  
Ahmedabad.

To study the association of vitamin D deficiency with lower respiratory tract infection.

To assess the vitamin D level with severity of lower respiratory tract infection.

#### **Objective:**

This study was done at pediatrics department, civil hospital, ahmedabad which is observational study including 75 patient from age 1 month to 12 years. All lower respiratory tract infection children between age 1 month to 12 years of age included, while age less than 1 month and more than 12 years of age excluded in this study.

### **MATERIALS AND METHODS**

All patients aged 1 month to 12 years with lower respiratory tract infections admitted as inpatient in the Department of Pediatrics, civil hospital ahmedabad has been tested for serum Vitamin D levels by standard serological test. Informed consent will be taken from the parents. All data collected by filling preformed performa. About 3 ml of blood is collected and sent for serum 25 (OH) vitamin D analysis.

Age	Vitamin D3 Sufficient Level (N=43)	Vitamin D Insufficient Level (N=21)	Vitamin-D Deficient Level (N=11)	P Value
1 month-6 month	4(9.3%)	2(9.5%)	3(27.2%)	0.0438
6 month-3 year	3(6.9%)	4(19.0%)	1(9.09%)	0.716
3 year-6 year	15(34.8%)	3(14.2%)	4(36.3%)	0.521
6 year-9 year	16(37.2%)	7(33.3%)	2(18.1%)	0.485
9 year-12 year	5(11.6%)	5(23.8%)	1(0.09%)	0.397
Chi-square Statistic	9.3737			
p-value	0.3117			

p-value <0.05= significant >0.05=not significant

Risk Factors		Vitamin D Sufficient	Vitamin D Insufficiency	Vitamin D Deficiency	P Value
H/O Sun Light Exposure	Yes	37	8	2	<0.00001
	NO	6	13	9	<0.00012
P-Value		<0.00001			
H/O Of Exclusive Breast Feeding With Vitamin-D Supplememnts	Yes	8	6	1	<0.00024
	NO	2	9	7	<0.00001
H/O Of Not Exclusive Breast Feeding With Vitamin-D Supplememnts	Yes	23	3	1	<0.00017
	NO	10	3	2	<0.00031
Vegetarian Diet	Yes	18	9	5	<0.0725
	NO	21	11	2	<0.0050
P-Value		<0.00015			

p-value <0.05 = significant value.

In vitamin D3 sufficient patient, 86.04% has H/O sunlight exposure.

In vitamin D3 deficient 81.8% patients have history of improper sunlight exposure.

Total 75 patients has been enrolled in this study. Patient from 1 month to 12 years were included.

Out of 75 patients, 44 patients are male (58.6%) and 31 patients are female (41.33%)

Sex	No. Of Patients
Male	44
Female	31
Total	75

In this study, Out of 75 patients, 43 patients have sufficient vitamin D3 level while 21 patients have vitamin D3 insufficiency and 11 patients have vitamin D3 deficiency.

Vitamin D level	No of patients	%
Vitamin D sufficient level	43	57%
Vitamin D insufficient level	21	28%
Vitamin D deficient level	11	15%
Total	75	100%

#### **Age wise distribution:**

In vitamin D3 insufficient patients 38.09% have H/O proper sunlight exposure while 61.90% have improper sunlight exposure.

#### **Vitamin D Deficiency With Rti Vs Exclusive Breast Feeding**

Study	n	Number of breast fed	% of Vitamin D deficiency in breast
In our Study	75	33	44%
Yashownt et.al	90	50	47%
Nighat haider et.al	137	137	85.3%

#### **Vitamin D Deficiency With RTI Vs SUN Exposure**

Study	n	Sun exposed	Not to sun exposed
In our Study	75	62%	38%
Yashownt et.al	90	21%	79%
Nighat haider et.al	137	55.1%	98.3%

## Shah et al; Vit D3 Level in Lower Respiratory Tract Infection

### • Vitamin D Level & Malnutrition:

Grade Of Malnutrition	Vitamin D Sufficient	Vitamin D Insufficient	Vitamin D Deficient	P Value
Normal	12	3	1	0.074
Pem Grade-1	18	10	2	0.826
Pem Grade-2	11	8	7	0.217
Pem Grade-3	2	0	1	0.096
Total	43	21	11	

- There is no correlation between malnutrition and vitamin D level.

### • Types Of Lower Respiratory Tract Infection

	Vitamin D Sufficient	Vitamin D Insufficient	Vitamin D Deficient	Total	P Value
Walri	18	7	3	28(37.3%)	0.083
Bronchiolitis	0	1	1	2(0.02%)	0.626
Pneumonia	20	9	15	34(45.3%)	0.851
Plural Effusion	5	4	2	11(14.6%)	0.967
Chi-Square Test	2.351				
P-Value	0.884				

p-value <0.05 is significant

- There is no correlation between vitamin D3 level and lower respiratory tract infection patient.

## DISCUSSION

Vitamin D3 deficiency and number of lower respiratory tract infection are more common in male children than female child. Vitamin D3 level were low in children who were exclusively breast fed for 6 months (71.87%). Vitamin D3 level were low in children who are not taking vitamin D3 supplements. Vitamin D3 levels were low in children who had poor exposure to sunlight (81.8%). Most common lower respiratory tract infection in this study is pneumonia that associated with low vitamin d level. There is no significant association between vegetarian diet and vitamin D3 level. There is no significant association between malnutrition and vitamin D3 level. There is no significant association between lower respiratory tract infection and vitamin D3 level.

4. Yorifuji J, Yorifuji T, Tachibana K, Nagai S, Kawai M, Momoi T, Nagasaka H, Hatayama H, Nakahata T. Craniotabes in normal newborns: the earliest sign of subclinical vitamin D deficiency.
5. Williams B, Williams AJ, Anderson ST. Vitamin D deficiency and insufficiency in children with tuberculosis.
6. Liu PT, Stenger S, Li H, Wenzel L, Tan BH, Krutzik SR, et al. Toll-like receptor triggering of a vitamin D mediated human antimicrobial response. Science. 2006;
7. Sundaram ME, Coleman LA. Vitamin D and influenza

**How to cite this article:** Shah B, Gosai D, Rathod N. Study of VIT D3 Level in Lower Respiratory Tract Infection Patient. Ann. Int. Med. Den. Res. 2019; 5(4):TB01-TB03.

**Source of Support:** Nil, **Conflict of Interest:** None declared

## CONCLUSION

Vitamin D3 supplements should be given to every infant with breast feeding. Each patient admitted for respiratory tract infection should be given vitamin D3 supplements as prophylaxis. Appropriate supplement and proper exposure to sunlight may helpful in maintaining vitamin D3 level.

## REFERENCES

1. Sachan A, Gupta R, Das V, Agarwal A, Awasthi PK, Bhatia V. High prevalence of vitamin D deficiency among pregnant women and their newborns in northern India. Am J Clin Nutr.
2. Ehab AM, Albanna, Yasser F, Ali, Reayid AM, Elkashmia. Vitamin D and LL-37 in children with pneumonia
3. Balasubramanian S, Ganesh R. Vitamin D deficiency in exclusively breast-fed infants. Indian J Med Res. 2008 Mar;127(3):250-5. Review