

## Observational Study of Serum Vitamin D Levels in Children under Five Years Suffering From Pneumonia in A Tertiary Care Hospital – Rims Ranchi

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**Abstract:** *OBJECTIVES:* Observational study of serum vitamin D levels in children under five years suffering from pneumonia *METHOD:* A retrospective observational study was carried out in pediatrics OPD and Inpatient department, RIMS, Ranchi. The study included 95 children with pneumonia and 95 healthy controls who were selected randomly. Serum 25(OH)D levels were detected and estimated by chemiluminescence method. For categorical analysis of the vitamin D status, cut off values of  $\geq 30$  ng/mL for sufficiency, 20–30 ng/mL for insufficiency, 10–20 ng/mL for deficiency, and  $\leq 10$  ng/mL for severe deficiency were set. *RESULTS:* A total of 190 children were enrolled in the study, including 96 girls and 94 boys, ranging in age from 1 month to 5 years. The serum 25(OH)D levels of the 190 children were not normally distributed, with a median of 23.7 ng/mL, typically in the insufficient state. The overall vitamin D status was as follows: 48 cases (26.4%) were in a state of sufficiency, whereas 142 (73.6%) were inadequate. Among the inadequate children, insufficiency was found in 72 cases (53.1%), deficiency in 48 cases (34.6%), and severe deficiency in 22 cases (12.3%). The age and gender between the two groups were matched. *CONCLUSION:* Vitamin D is involved in regulating innate and adaptive immune functions. Maintenance of adequate vitamin D status may be an effective and inexpensive prophylactic method against pneumonia.

**Keywords:** pneumonia, under five children, vitamin D

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### I. Introduction

Infections of the respiratory tract are the most common human ailment. According to WHO, every year ARI in young children is responsible for an estimated 3.9 million deaths worldwide. About 90% of the ARI deaths are due to pneumonia which is usually bacterial in origin<sup>[1]</sup>. Vitamin D is recognized as the sunshine vitamin<sup>[2]</sup>. It is also proved to be a prohormone with numerous functions in the body. Vitamin D is thought to have roles in improvement of immunity and in reducing inflammation. Vitamin D induces the expression of two antimicrobial peptides—cathelicidin and  $\beta$ -defensin—that play a key role in innate immunity owing to their chemotactic action and toxin neutralization. Accordingly, there is evidence that consumption of vitamin D may reduce respiratory tract infection (RTI) susceptibility in children<sup>[3,4]</sup>.

### II. Objectives

To estimate serum vitamin D levels in children under five years suffering from pneumonia

### III. Methods

A retrospective observational study was carried out in pediatrics OPD and Inpatient department, RIMS, Ranchi. The study included 95 children with pneumonia and 95 controls who were selected randomly. Serum 25(OH)D levels were detected and estimated by chemiluminescence method. For categorical analysis of the vitamin D status, cut off values of  $\geq 30$  ng/mL for sufficiency, 20–30 ng/mL for insufficiency, 10–20 ng/mL for deficiency, and  $\leq 10$  ng/mL for severe deficiency were set.

### IV. Results

A total of 190 children were enrolled in the study, including 96 girls and 94 boys, ranging in age from 1 month to 5 years. The serum 25(OH)D levels of the 190 children were not normally distributed, with a median of 23.7 ng/mL, typically in the insufficient state. The overall vitamin D status was as follows: 48 cases (26.4%) were in a state of sufficiency, whereas 142 (73.6%) were inadequate. Among the inadequate children,

insufficiency was found in 72 cases (53.1%), deficiency in 48 cases (34.6%), and severe deficiency in 22 cases (12.3%). The age and gender between the two groups were matched, and the distributions of age, gender, season, and vitamin D status in the 2 groups are shown in Tables 1, 2, 3, 4.

**Table 1: Age distribution among cases and controls**

Age	Cases (%)	Controls (%)
<12 months	38 (40%)	29 (30.5%)
12 - 35 months	28 (29.45)	33 (34.7%)
36 - 60 months	29 (30.5%)	33 (34.7%)

**Table 2: Gender distribution among cases and controls**

Gender	Cases(%)	Controls(%)
Male	48 (50.5%)	46 (48.4)
Female	47 (49.4%)	49 (51.5%)

**Table 3: Vitamin D levels among cases and controls**

Vit d level (ng/ml)	Cases (%)	Controls (%)
Sufficient	14 (14.7%)	34 (35.75)
Insufficient	31 (32.6%)	41 (43.1%)
Deficient	30 (31.5%)	18 (18.9%)
Severe Deficient	20 (21%)	2 (2.1%)

**Table 4: Seasonal variation among cases and controls**

Season	Cases (%)	Controls (%)
Spring	16 (16.84%)	17 (17.89%)
Summer	2 (2.1%)	3 (3.15%)
Autumn	7 (7.36%)	7 (7.36%)
Winter	70 (73.68%)	68 (71.57%)

## V. Conclusion

Vitamin D is involved in regulating innate and adaptive immune functions. It was found that low vitamin D status is related to the susceptibility to pneumonia, and the degree of deficiency affects the critical condition of pneumonia cases. Maintenance of adequate vitamin D status may be an effective and inexpensive prophylactic method against pneumonia. To understand whether vitamin D supplementation is beneficial for preventing and treating pneumonia in children, further large-sample, transregional, polycentric studies are needed to clarify its role in children.

## References

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