CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES
http://doi.org/10.5281/zenodo.3403191

**Available online at:** http://www.iajps.com *Research Article*

# EFFICACY OF VITAMIN D IN CHILDREN WITH COMMUNITY ACQUIRED PNEUMONIA (CAP)

**[1]Dr Samra Liaqat; [2]Dr Malik Abid Ali; [3]Dr Asad Mahmood Khan**

[1]Senior registrar (Paediatric Medicine), The children Hospital and Institute of Child Health;
[2]Assistant Professor (Paediatric Medicine), King Edward Medical University, Lahore;
[3]Associate Professor (Pharmacology), Faisalabad Medical University, Faisalabad

**Article Received:** July 2019 **Accepted:** August 2019 **Published:** September 2019

**Abstract:**

***Objective:*** *To determine the efficacy of vitamin D in children with community acquired pneumonia.* ***Study design:*** *Randomized controlled trial.*

***Place and duration of study:*** *The children Hospital and Institute of Child Health, Faisalabad during 15-05-2019 to 15-07-2019.*

***Material and Methods:*** *In this study the cases of either gender with age up to 12 years were included. The subjects were enrolled that were suffering from community acquired pneumonia, diagnosed by symptoms of fever, cough, sputum and non homogenous opacities on chest x ray. They were divided into two groups. The cases in group A were given vitamin D along with standard antibiotics and those in group B were given same quantity of the normal saline along with standard antibiotics. These cases were then followed to look for time taken to normalization of the CRP and also fro mean hospital stay.*

***Results:*** *In this study 100 cases were selected. 50 in each group. Mean age in group A and B was 7.13±1.23vs 7.34±1.31years and mean duration of symptoms was 2.23±1.47 vs 2.21±1.34 days. Mean hospital stay in group A and B was 4.11±1.53 vs 6.34±0.67 with p= 0.01 and mean time to normalization of CRP was 3.87±1.94 vs 6.23±3.11 days with p= 0.001.*

***Conclusion:*** *Vitamin D plus antibiotics is significantly better as compared to antibiotic and placebo in children with community acquired pneumonia.*

**Key Words;** *CAP, Vitamin D, Antibiotics, CRP*

**Corresponding author:**

**Dr. Samra Liaqat,**
*Senior registrar (Paediatric Medicine),*
*The children Hospital and Institute of Child Health.*

QR code

*Please cite this article in press Samra Liaqat et al.,* ***Efficacy Of Vitamin D In Children With Community Acquired Pneumonia (CAP).,*** *Indo Am. J. P. Sci, 2019; 06[09].*

## INTRODUCTION:

Worldwide, community acquire pneumonia (CAP) is the leading cause of mortality among under-five children, accounting for approximately 1.3 million deaths annually. Most of these deaths occur in South Asia and Africa where the prevalence of malnutrition among children is high. The consequences of pneumonia are even more severe on account of lower immunity among children with malnutrition.[1-2]

Low-cost interventions for better management of pneumonia, particularly those which can boost the immune response, might hence contribute to decreased mortality rates from pneumonia in children. The role of vitamin D in immunity and consequently in the pathogenesis, treatment and prevention of human infectious diseases, particularly of the respiratory tract, has come into limelight in the last few decades, although the role of vitamin D in tuberculosis has been postulated for more than a century. The vitamin D receptor (VDR) and CYP27B1 (the enzyme which converts vitamin D into its active form) has been found in macrophages, monocytes, dendritic cells and respiratory epithelial cells, which play a pivotal role in innate as well as adaptive immune responses.[3-4]

Vitamin D deficiency has been linked to increased susceptibility to various infectious diseases, pneumonia and tuberculosis being the most prominent among them. The role of vitamin D in preventing infections has been studied in multiple randomised controlled trials (RCTs). Previous systematic reviews which have investigated the role of vitamin D supplementation for prevention of respiratory infections indicate a protective effect of vitamin D.[5-6]

Vitamin D levels have been correlated to the severity of pneumonia in children in various case-control studies. In rickets, which is a very severe form of vitamin D deficiency (leading to even skeletal malformations and calcium deficiency), the risk of respiratory infections in children has been found to be increased. Given that previous systematic reviews have focused on prevention of pneumonia through vitamin D supplements, and given evidence from observational studies on the link between vitamin D and pneumonia, we planned to see the role of this in the management of community acquired pneumonia (CAP).[7-8]

## OBJECTIVE:

To determine the efficacy of vitamin D in children with community acquired pneumonia.

## PATIENTS AND METHODS:

This descriptive case series study was carried out at Department of Paediatrics, The children Hospital and Institute of Child Health, Faisalabad during 15-05-2019 to 15-07-2019. In this study the cases of either gender with age up to 12 years were included. The subjects were enrolled that were suffering from community acquired pneumonia, diagnosed by symptoms of fever, cough, sputum and non homogenous opacities on chest x ray. They were divided into two groups by random number allocation method. The cases in group A were given vitamin D along with standard antibiotics and those in group B were given same quantity of the normal saline along with standard antibiotics. These cases were then followed to look for time taken to normalization of the CRP and also fro mean hospital stay.

## STATISTICAL ANALYSIS:

The data was entered and analysed by SPSS-version 23.0. qualitative variables were presented as frequencies and quantitative as mean and standard deviation. Independent sample t test was used for data stratification and p value less than 0.05 was taken as significant.

## RESULTS:

In this study 100 cases were selected. 50 in each group. Mean age in group A and B was 7.13±1.23vs 7.34±1.31years and mean duration of symptoms was 2.23±1.47 vs 2.21±1.34 days as in table I. Mean hospital stay in group A and B was 4.11±1.53 vs 6.34±0.67 with p= 0.01 and mean time to normalization of CRP was 3.87±1.94 vs 6.23±3.11 days as shown in table II with p= 0.001.

**Table I. Study variables (n= 50 in each group)**

| Group | A | B |
|---|---|---|
| **Variables** | **Mean SD** | **Mean SD** |
| **Age** | 7.13±1.23 | 7.34±1.31 |
| **Weight** | 14.23±4.91 | 13.57±5.11 |
| **Duration of symptoms** | 2.23±1.47 | 2.21±1.34 |
| | **Number** | **Number** |
| **Male** | 58 | 54% |
| **Female** | 42 | 46% |
| **Right side of lung** | 48 | 50% |
| **Left side of lung** | 44 | 45% |
| **Bilateral** | 8 | 5% |

**Table II. Efficacy of vitamin D**

| Group | A | B | p |
|---|---|---|---|
| **Variables** | **Mean ± SD** | **Mean ± SD** | |
| **Hospital stay** | 4.11±1.53 | 6.34±0.67 | 0.01 |
| **Time to normalize CRP** | 3.87±1.94 | 6.23±3.11 | 0.001 |

## DISCUSSION:

Pneumonia is a leading cause of children's morbidity and mortality worldwide. There are number of factors that can predispose to its development and some of them are correctable and immense work is being done regarding the vitamin D status and immune system in the recent times. Some studies have reported that vitamin D deficiency is associated with an increased incidence of lower respiratory illness requiring hospitalization and similarly replacement of these can largely reduce the risk of severity and can also help in early cure in such cases.[9-10]

In the present study, mean hospital stay in group A and B was 4.11±1.53 vs 6.34±0.67 with p= 0.01 and mean time to normalization of CRP was 3.87±1.94 vs 6.23±3.11 days II with p= 0.001 favouring the better outcome in cases with vitamin D group. These results were slightly different with the scarce data that has shown the utility of vitamin D in the effectiveness of the respiratory tract infections.

A recent individual participant meta-analysis showed that vitamin D supplementation does have a protective effect against acute respiratory infections, particularly in individuals with vitamin D deficiency6.[11] However, there are few studies of the effect of vitamin D as adjunct treatment for pneumonia. Four randomised controlled trials have examined adjunct vitamin D therapy for pneumonia, all in children under 5 years of age.[12-15] Despite differences in treatment dose and primary outcome measures, all four trials showed no improvement in the resolution of the acute manifestations of pneumonia, despite high prevalences of vitamin D deficiency. However, one of these trials in hospitalised Afghani children did show a significantly reduced risk of a repeat episode of pneumonia within 90 days of supplementation.[13]

## CONCLUSION:

Vitamin D plus antibiotics is significantly better as compared to antibiotic and placebo in children with community acquired pneumonia.

## REFERENCES:


1. Kelly M, Sandora T. *Nelson Textbook of Pediatrics.* 2016; : 2088 -94.
2. Camargo CJ, Ingham T, Wickens K, Thadhani R, Silvers KM, Epton MJ, et al. Cord-blood 25-hydroxyvitamin D levels and risk of respiratory infection, wheezing, and asthma.*Pediatrics.* 2011; 127(1) -7
3. Holick MF. Vitamin D deficiency. *N Engl J Med.* 2007; 357(3) : 266 -81
4. Zittermann A, Dembinski J, Stehle P. Low vitamin D status is associated with low cord blood levels of the immunosuppressive cytokine interleukin-10. *Pediatr Allergy Immunol.* 2004; 15(3) : 242 -6
5. Walker VP, Modlin RL. The vitamin D connection to pediatric infections and immune function. *Pediatr Res.* 2009; 65(5 Pt 2) : 106R -13R
6. Banajeh SM. Nutritional rickets and vitamin D deficiency--association with the outcomes of childhood very severe pneumonia: a prospective cohort study. *Pediatr Pulmonol.*2009; 44(12) : 1207 -15

7. Najada AS, Habashneh MS, Khader M. The frequency of nutritional rickets among hospitalized infants and its relation to respiratory diseases. *J Trop Pediatr*. 2004; 50(6) : 364 -8
8. Leikina E, Delanoe-Ayari H, Melikov K, Cho MS, Chen A, Waring AJ, et al. Carbohydrate-binding molecules inhibit viral fusion and entry by crosslinking membrane glycoproteins. *Nat Immunol*. 2005; 6(10) : 995 -1001
9. Kashi Z, Saeedian F, Akha O, Gorgi M, Emadi S, Zakeri H. Vitamin D deficiency prevalence in summer compared to winter in a city with high humidity and a sultry climate.*Endokrynol Pol*. 2011; 62(3) : 249 -51
10. Albanna EAM, Ali YF, Elkashnia RAM. Vitamin D and LL-37 in children with pneumonia.*Egypt J Pediatr Allergy Immunol*. 2010; 8(2):1-5.
11. Martineau, A. R. *et al*. Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data. *BMJ. 2017;* 356, i6583.
12. Gupta, P. *et al*. Vitamin D Supplementation for Treatment and Prevention of Pneumonia in Under-five Children: A Randomized Double-blind Placebo Controlled Trial. *Indian pediatrics* 2016; 53, 967–976
13. Manaseki-Holland, S. *et al*. Effects of vitamin D supplementation to children diagnosed with pneumonia in Kabul: a randomised controlled trial. *Tropical medicine & international health: TM & IH. 2010;*15, 1148–1155
14. Somnath, S. H., Biswal, N., Chandrasekaran, V., Jagadisan, B. & Bobby, Z. Therapeutic effect of vitamin D in acute lower respiratory infection: A randomized controlled trial. *Clin Nutr ESPEN* 2017;20, 24–28
15. Choudhary, N. & Gupta, P. Vitamin D supplementation for severe pneumonia–a randomized controlled trial. *Indian pediatrics* 2012;49, 449–454