



CODEN [USA]: IAJPBB

ISSN : 2349-7750

INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187

Available online at: <http://www.iajps.com>

Review Article

INCIDENCE OF DEFICIENCY OF VITAMIN D3 AMONG CHILDREN PRESENTING WITH RECURRENT SINO- PULMONARY INFECTIONS

¹Dr Nuzhat Rasheed, ²Dr Hina Anwar, ³Dr Hina Abbasi

¹Azad Jammu and Kashmir Medical College., ²Azad Jammu and Kashmir Medical College.,

³Azad Jammu and Kashmir Medical College.

Article Received: November 2020 Accepted: December 2020 Published: January 2021

Abstract:

Aims: To determine the prevalence of vitamin D deficiency in children (6 months - 5 years of age) with recurrent pulmonary-pulmonary infections, staying in an outpatient setting.

Place and Duration: In the Pediatric Unit-II of Holy Family Hospital, Rawalpindi for one-year duration from November 2019 to November 2020.

Methods: It was a descriptive study conducted on children aged 6 months to 5 years. 1000 children were enrolled in the study, and their data were recorded on a previously prepared proforma.

Results: Of 1000 cases, 830 (83.0%) children were deficient in vitamin D3 (group I), 112 (11.2%) had vitamin D3 deficiency (group II), which is 94.2%, 57 (5.7 %) had the desired level (group III) and 1 (0.1%) had vitamin D intoxication (group IV). In this age group, more children were 1-3 years old. 236 (23.6%) were ranging from 1 to 2 years, 256 (25.6%) from 2 to 3 years. 602 (60.2%) were males and 398 (39.8%) females. Most of them had bronchiolitis 356 (35.6%), followed by pneumonia 320 (32.0%), otitis media 194 (19.4%), and acute tonsillitis 134 (13.4%). In group I (n = 830), bronchiolitis 352 (42.4%) and pneumonia 296 (35.6%) were more common, and less common was acute tonsillitis 72 (8.6%). In group II (n = 112) 52 (46.42%) had bronchiolitis, 32 (28.5%) had pneumonia, and less commonly had acute tonsillitis (8.9%). In group III (n = 57), the dominant diagnosis was tonsillitis [23 (40.35%)], followed by bronchiolitis [9 (15.7%)].

Conclusions: Children 6 months to 5 years of age with recurrent sino-pulmonary infections ie (bronchiolitis, pneumonia, otitis media and acute tonsillitis) tended to be deficient in serum vitamin D3. It is recommended that vitamin D3 levels be assessed in all children with recurrent respiratory infections.

Key words: Vitamin D3 level, sino-pulmonary infections, pneumonia, bronchiolitis, otitis media, acute tonsillitis.

Corresponding author:

Dr. Nuzhat Rasheed,

Azad Jammu and Kashmir Medical College.

QR code



Please cite this article in press Nuzhat Rasheed et al, **Incidence Of Deficiency Of Vitamin D3 Among Children Presenting With Recurrent Sino-Pulmonary Infections.**, Indo Am. J. P. Sci, 2021; 08(1).

INTRODUCTION:

Vitamin D is a group of fat-soluble vitamins with unique properties in the human body. An organic chemical is called a vitamin that the body cannot synthesize in sufficient quantities and must be obtained from food along with other essential compounds. English physician Dr. Daniel Whistler first described rickets in 1645. In 1861, Trousseau in France linked rickets to a lack of sun exposure and an incorrect diet. Worldwide, feeding rickets is the most common form in children. Long-term exclusive breastfeeding without vitamin D supplementation also leads to rickets, especially if the mother is also deficient. Serum vitamin D3 levels measure endogenous synthesis as a result of exposure to sunlight as well as food intake. Vitamin D is converted into calcidiol in the liver and some calcidiol is converted by the kidneys into calcitriol, the biologically active form of vitamin D. It circulates in the blood to control and regulate calcium and phosphate levels to support healthy bone growth. Calcitriol also affects neuromuscular function and inflammation. Five forms of vitamin D have been discovered, vitamin D1, D2, D3, D4, D5. The two forms in humans are D3 and D2. It is also a regulator of the immune system, and its deficiency will lead to recurrent infections. Recent lifestyle changes and a number of other factors such as lack of sun exposure, intense environmental pollution, latitude, and covering the body surface with clothing for most of the day, affect vitamin D synthesis. More indoor work, a cloudy and smog environment causes a deficiency, and the use of sunscreen blocks the absorption of ultraviolet rays needed for the photosynthesis of vitamin D. from natural foods and supplements. Children at high risk of vitamin D deficiency should consume 400 IU of vitamin D daily so that their bloodstream has good levels of 25-hydroxyvitamin D. Infants need 200 IU per day of vitamin D, which they can get from egg yolk (20 IU), cheese (ounce = 12 IU), margarine (1 tablespoon = 60 IU), cod liver oil (1 tablespoon = 1360 IU), cooked fish (1 oz = 150 IU), and chicken liver. The best sources of vitamin D rich foods include fish such as salmon, tuna and mackerel, as well as fish liver oil. Some vitamin D is also present in beef liver, cheese and egg yolk. Most of them are vitamin D3. Some mushrooms provide varying amounts of vitamin D2. Our study looked at the blood levels of 25-

hydroxyvitamin D3 in children from 6 months to 5 years old. We also investigated the relationship of 25-hydroxyvitamin D3 [a precursor to the active form of 1,25-dihydroxyvitamin D (calcitriol)] with recurrent sino-pulmonary infections. The following four groups were categorized;

- Group I - deficient (<20ng / ml)
- Group II - insufficient (20-39 ng / ml)
- Group III - desired L (40-100 ng / ml)
- Group IV - Narcotic (> 100ng / ml)

MATERIAL AND METHODS:

This was a descriptive study held in the Pediatric Unit-II of Holy Family Hospital, Rawalpindi for one-year duration from November 2019 to November 2020. 1,000 children with recurrent pulmonary-pulmonary infections were enrolled in the study. We defined recurrent infections as more than 4 episodes in the last 12 months. In all these patients, blood samples were taken for 25-hydroxyvitamin D D3 levels, 3 ml of blood was collected with all aseptic measures at any time of the day without any special preparation. All samples were sent to the same reference laboratory to avoid bias and collated as described. Data collection procedures were based on a questionnaire for the clinical diagnosis of vitamin D deficiency and its complications. Informed consent has been withdrawn from the parents. The pediatrician completed the pre-designed Pro forma all suspect cases from 6 months to 5 years of age with frequent sinu-pulmonary infections. Children with congenital malformations, mental retardation, and known cases of malabsorption syndromes were excluded.

RESULTS:

A total of 1,000 cases (6 months to 5 years) with vitamin D3 levels and frequent pulmonary infections were included in the study. Of these, 830 (83.0%) children were deficient in vitamin D3, 112 (11.2%) had insufficient levels, 57 (5.7%) had the desired level, and 1 (0.1%) had vitamin D intoxication. There are more children aged 1-3 in the age group. 236 (23.6%) were between 1 and 2 years of age, 256 (25.6%) were in the range 2 to 3 years of age and fewer were observed in children less than one year of age (Table 1).

TABLE 1: Age group, n=1000

Age	Number	Percentage
6 month - 1 Year	120	12.0
1-2 Year	236	23.6
2-3 Year	256	25.6
3-4 Year	188	18.8
4-5 Year	200	20.0

TABLE 2: Gender, n=1000

Sex	No.	Percentage
Male	602	60.2
Female	398	39.8

TABLE 3: Groups of Vitamin D3 level, n=1000

Groups	Type	Level	Number	Percentage
Group 1	Vitamin D Deficiency Level	<20	830	83.0
Group II	Vitamin D Insufficiency Level	21-39	112	11.2
Group III	Vitamin D Desirable Level	40-100	57	5.7
Group IV	Vitamin D Intoxication	>100	1	0.1

TABLE 4: Types of Infections: n=1000

Disease	No.	Percentage
Bronchiolitis	356	35.6
Pneumonias	320	32.0
Otitis Media	194	19.4
Acute Tonsillitis	134	13.4

TABLE 5: Group 1 vitamin deficient level n=830

Disease	No.	Percentage
Bronchiolitis	352	42.40%
Pneumonias	296	35.66%
Otitis Media	110	13.25%
Acute Tonsillitis	72	8.67%

TABLE 6: Group II vitamin D insufficient level n=112

Disease	No.	Percentage
Bronchiolitis	52	46.42
Pneumonias	32	28.57
Otitis Media	18	16.07
Acute Tonsillitis	10	8.92

602 (60.2%) were males and 398 (39.8%) females. In the disease distribution (n = 1000), more children had bronchiolitis 356 (35.6%), followed by pneumonia 320 (32.0%), otitis media 194 (19.4%) and acute tonsillitis 134 (13, 4%). In group I (n = 830)) bronchiolitis 352 (42.4%) and pneumonia 296 (35.6%) were more frequent, and less common was acute tonsillitis 72 (8.6%) (Table 5).

In group II (n = 112) 52 (46.42%) had bronchiolitis, 32 (28.5%) had pneumonia, less often acute tonsillitis 10 (8.9%). In group III (n = 57), 23 more children with tonsillitis (40.35%) were observed and a smaller number was bronchiolitis, 9 (15.7%) (Table 7).

TABLE 7: Group III vitamin D Desirable level n=57

Disease	No.	Percentage
Bronchiolitis	9	15.7
Pneumonias	10	17.54
Otitis Media	15	26.31
Acute Tonsillitis	23	40.35

Thus, evidence of vitamin D3 deficiency was found more frequently in the age group 2 to 4 years, and lung infections were more common in children, which is 94.2% in this study.

DISCUSSION:

In our study, we analyzed 1,000 children 6 months to 5 years of age with recurrent sinus and lung infections in the hospital and assessed them for vitamin D deficiency status. The association of vitamin D3 deficiency with recurrent sinuses is well established; A study by Muhe and Rehman shows that vitamin D deficiency in children is strongly associated with recurrent respiratory infections. Oduwole and Manaseki showed that vitamin D supplementation improves pneumonia outcomes in children. Wagner and Bhutta discussed its key role in the human immune system and its relationship to long-term disease risk in infants and nursing mothers. Reid showed a link between vitamin D deficiency and tonsillitis. He concluded that children with vitamin D3 levels <12 ng / L are often associated with a high risk of pneumonia in children 6-48 months of age, and vitamin D supplementation, along with appropriate and timely antibiotic use, reduces the number of new episodes of pneumonia in period of 90 days. Holick's study found that vitamin D deficiency increases the incidence of bronchiolitis in a deficient population. Similarly, Urashima et al. In a randomized trial proved that vitamin D supplementation prevents seasonal influenza in school-age children. Banajeh and Wayse et al. Have also documented the association of subclinical vitamin D deficiency in children under 5 years of age with severe lower respiratory tract infections. Najadaet et al. In a clinical study, determined the prevalence of nutritional rickets and its association with respiratory tract infections. Baby foods fortified with vitamin D play an important role in regulating the immune system and have the potential to protect them from disease. The WHO / UNICEF World Action Plan says pneumonia is the world's leading cause of death for young children, and more than 11

million children require hospitalization for pneumonia each year, and these children are also vitamin D deficient. Vitamin D supplementation allows their bodies to fight against recurrent respiratory infections, including pneumonia, bronchiolitis and tonsillitis. The American Academy of Pediatrics recommends 400i.u prophylaxis per day from birth to adolescence. In Kabul, Manaseki-Holland shows the effect of vitamin D supplementation in children diagnosed with pneumonia. Yamshchikov et al. And Salimpur proved the preventive role of vitamin D in infections. Hancox investigated the role of vitamin D in innate immunity, and supplementation with vitamin D improves outcomes in community-acquired pneumonia. Vitamin glistening in the sun and its role has been confirmed in studies conducted by Freishtat. Vitamin D deficiency is high among African Americans in downtown. In Turkey, Yildiz et al. And von Essen et al. Have shown in their studies that low vitamin D levels in the blood serum in children with recurrent tonsillitis and the association of vitamin D receptor gene polymorphism with decreased anti-tuberculosis activity. Zhang et al. In March 2012, they discovered specific molecular signaling events whereby vitamin D inhibits inflammation, and low levels of vitamin D do not inhibit an inflammatory cascade comparable to those at adequate levels. Thus, vitamin D deficiency also leads to diseases other than bone, such as bronchopneumonia, asthma and tonsillitis.

CONCLUSION:

1. Children with frequent sinus and lung infections are deficient in vitamin D3 and contribute to significant morbidity.
2. The vast majority of our population is deficient in vitamin D3 and is more common in children aged 6 months to 5 years.

REFERENCES:

1. Rao, Sudhakar, and Deepak Karade. "A Clinical Study of Serum Vitamin D Levels in Chronic

- Tonsillitis among Paediatric Age Group." *Bengal Journal of Otolaryngology and Head Neck Surgery* 28, no. 1 (2020): 23-29.
2. Morice, Alyn H., Eva Millqvist, Kristina Bieksiene, Surinder S. Biring, Peter Dicipinigitis, Christian Domingo Ribas, Michele Hilton Boon et al. "ERS guidelines on the diagnosis and treatment of chronic cough in adults and children." *European Respiratory Journal* 55, no. 1 (2020).
 3. Ismayilov, Rashad, Ilgin Yildirim Simsir, Deniz Akyol, and Fatma Omur Ardeniz. "Primary hypoparathyroidism in a patient with common variable immunodeficiency associated enteropathy." *Romanian Journal of Internal Medicine* 1, no. ahead-of-print (2020).
 4. Grammatikos, Alexandros, Philip Bright, Rahul Bhatnagar, and Sarah Johnston. "How to investigate a suspected immune deficiency in adults." *Respiratory medicine* 171 (2020): 106100.
 5. Stern, Jessica, Jennifer Pier, and Augusto A. Litonjua. "Asthma epidemiology and risk factors." In *Seminars in Immunopathology*, pp. 1-11. Springer Berlin Heidelberg, 2020.
 6. Amirifar, Parisa, Reza Yazdani, Tannaz Moeini Shad, Alireza Ghanadan, Hassan Abolhassani, Martin Lavin, Soheila Sotoudeh, and Asghar Aghamohammadi. "Cutaneous granulomatosis and class switching defect as a presenting sign in ataxia-telangiectasia: first case from the national Iranian registry and review of the literature." *Immunological investigations* 49, no. 6 (2020): 597-610.
 7. Pacheco, Susan E., and James M. Stark. "Pulmonary Manifestations of Immunodeficiency and Immunosuppressive Diseases Other than Human Immunodeficiency Virus." *Pediatric Clinics* 68, no. 1 (2021): 103-130.
 8. Rafique, Bushra, Ahad Korar, and Summan Sohail. "Research Article Management of Cystic Fibrosis—Challenges in Pakistan."
 9. Ouahed, Jodie, Elizabeth Spencer, Daniel Kotlarz, Dror S. Shouval, Matthew Kowalik, Kaiyue Peng, Michael Field et al. "Very early onset inflammatory bowel disease: a clinical approach with a focus on the role of genetics and underlying immune deficiencies." *Inflammatory bowel diseases* 26, no. 6 (2020): 820-842.
 10. Tenenbaum, Silvia, E. Ann Yeh, and Guthy-Jackson Foundation International Clinical Consortium. "Pediatric NMOSD: A review and position statement on approach to work-up and diagnosis." *Frontiers in Pediatrics* 8 (2020).
 11. Kisa, Pelin Teke, and Nur Arslan. "Inborn errors of immunity and metabolic disorders: current understanding, diagnosis, and treatment approaches." *Journal of Pediatric Endocrinology and Metabolism* 1, no. ahead-of-print (2020).
 12. Bardou, Maine Luellah Demaret, Marina Teixeira Henriques, and Anete Sevciovic Grumach. "Inborn errors of immunity associated with characteristic phenotypes." *Jornal de Pediatria* (2020).
 13. Munck, Anne, Aurélie Bourmaud, Gabriel Bellon, Paul Picq, Philip M. Farrell, and DPAM Study Group. "Phenotype of children with inconclusive cystic fibrosis diagnosis after newborn screening." *Pediatric Pulmonology* 55, no. 4 (2020): 918-928.
 14. Vardi, Iddo, Irit Chermesh, Lael Werner, Ortal Barel, Tal Freund, Collin McCourt, Yael Fisher et al. "Monogenic Inflammatory Bowel Disease: It's Never Too Late to Make a Diagnosis." *Frontiers in immunology* 11 (2020): 1775.
 15. dos Santos Vilela, Maria Marluce. "Human Inborn Errors of Immunity (HIEI): predominantly antibody deficiencies (PADs): if you suspect it, you can detect it." *Jornal de Pediatria* (2020).