

A Comparative Study of Vitamin D Levels in Adult Asthma as Compared to Normal Controls in Patients Attending Tertiary Care Hospital in Faridkot

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ABSTRACT

Background: Vitamin D has effects on the innate and adaptive immune system. Low Vitamin D levels are associated with poor asthma, reduced lung function, increased medication intake and exacerbations.

Methods: 50 patients and 50 controls were enrolled in this study in the age range between 25-40 years. Vitamin D was estimated for both the groups by principle of chemiluminescence.

Results: Vitamin D levels were found to be significantly lower in patients as compared to controls ($p < 0.001$). The asthmatic patients had Vitamin D mean of 19.91 ng/ml with SD of 5.40 and controls had mean value of Vitamin D=44.33 with SD 7.96

Conclusions: Vitamin D levels less than 30ng/ml are common in asthmatic patients supporting the hypothesis that vitamin D levels are lower in asthmatic patients and supplementation might be effective in prevention and treatment of asthma.

Keywords: Vitamin D, Asthma.

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Article History:

Received: 23-06-2016, Revised: 25-06-2016, Accepted: 05-07-2016

Access this article online	
Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2016.2.4.008	

INTRODUCTION

Asthma is a lifelong lung disease that makes it difficult for you to breathe sometimes. Asthma affects about 300 million individuals worldwide making it the most common long lasting disease. It causes significant financial and social burden on the families affected. Several factors are known to influence severity of asthma which includes family history, genetic predisposition, allergen exposure, infections, diet, tobacco smoke, pollution and Vitamin D status.¹⁻⁴

Sources of Vitamin D

Vitamin D is derived from two main sources out of which one is skin exposure to UV rays and the other is dietary intake from food such as fish, fish oil, liver, egg and dietary supplements.⁴

Vitamin D Metabolism

Vitamin D synthesis is initiated in the skin by exposure to solar UV radiation having wavelength between 290-315 nm, resulting in conversion of endogenous 7-dehydrocholesterol to pre vitamin D₃, which then isomerizes to Vitamin D₃. After entering the circulation it is transported by the vitamin D binding protein or albumin. Vitamin D₃ is hydroxylated in the liver by 25-hydroxylase to major circulating metabolite, 25(OH)D₃ which is converted to the biologically active form of Vitamin D, 1,25dihydroxy Vitamin D₃, in the kidney and other tissue by the 1 alpha-Hydroxylase.⁵

Risk Factors Vitamin D Deficiency/Insufficiency

Vitamin D deficiency is defined by most experts as a level of 25(OH)D <20ng/ml. Vitamin D insufficiency is defined as levels 25(OH)D in the range of 20-30 ng/ml on the basis of health outcomes. Several risk factors are linked to vitamin D deficiency

which includes lack of exposure to sunlight, pigmented skin, concealed clothing, use of sunscreen lotions, obesity, multiple short spaced pregnancies, liver disease, malabsorption, short bowel and drugs such as rifampicin, glucocorticoids and anticonvulsants.⁶

AIMS & OBJECTIVES

The aims of study was to estimate levels of Vitamin D in asthmatic patients and to compare it with healthy controls of the same age group to find out whether there is any relationship between Vitamin D deficiency and Asthma.

MATERIALS & METHODS

The present study was conducted in the Department of Biochemistry in collaboration the Department of Pulmonary Medicine, GGS Medical College Faridkot, Punjab. Vitamin D levels were estimated by the Principle of Chemiluminescence on fully automated Chemiluminescence Access-2 by Beckman Coulter.

Inclusion Criteria

A total of 50 subjects were enrolled in the study who attended OPD of Department of pulmonary medicine or admitted in the ward of the concerned Department. Age limit was 25-40 years. Provisional diagnosis was made by the physician of concerned specialty and diagnosis was confirmed by X-Ray chest and AEC. 50 controls were also enrolled for this study without having any history of diseases affecting the concerned parameters.

Exclusion Criteria

Those subjects were excluded from the study who were on hormone therapy, Vitamin D supplementation, on calcium mineral and dietary supplements and other factors affecting vitamin D levels.

Statistical Analysis

Evaluation of data was done on SPSS software.

RESULTS

The mean value of Vitamin D in asthmatic patients was found to be 19.91 along with SD of 5.40 and mean value of Vitamin D in Controls was found to be 44.33 and SD of 7.96. p value was found to be highly significant $p < 0.001$.

Table: Vitamin D levels in present study.

VITAMIN D LEVELS	MEAN	SD	p value
PATIENTS	19.91	5.40	$P < 0.01$ (Highly Significant)
CONTROLS	44.33	7.96	

DISCUSSION

In our study Vitamin D levels were found to be significantly lower in asthmatic patients as compared to controls.

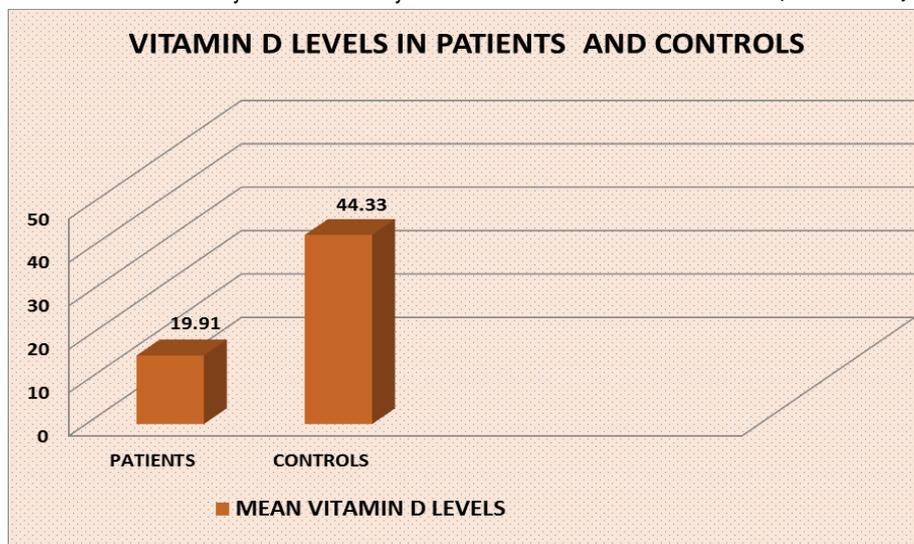
VDR (Vitamin D receptor) activities have been found in immune system (T and B cells, antigen presenting cells, macrophages and dendritic cells). Immune cells have enzymatic machinery to

activate 1,25 (OH)₂D. 1,25 (OH)₂D is able to traverse the cell membrane and act within the cells by binding to VDR in nucleus.⁴ Asthma is driven by enhanced activity of Th2 cells, which induce IgE production and eosinophilic airway inflammation and airway hyper-responsiveness. Vitamin D has multiple cytokine modulating effects through different cells of the immune system and T cells seem to be direct targets for 1,25(OH)₂D and five-fold increase in VDR expression has been reported after activation of CD4 cells.^{7,8} Studies on mouse also suggest and agree on the capacity of Vitamin D to inhibit T-cell proliferation and Th1 responses.⁹ Vitamin D also helps in reduction of IL-4 concentrations in attenuated inflammatory response. Besides this Vitamin D impair recruitment of eosinophils and reduce levels of IL-5 in model of eosinophilic inflammation.¹⁰

CONCLUSIONS

From our study it is clear that Vitamin D levels were found to be significantly lower in asthmatic patients as compared to controls resulting in reduced lung function in asthmatics. Vitamin D is known to have complex role in immune system and regulation of various aspects of immunity and has led to speculation on its potential role in asthma by inhibiting inflammation.

So in nutshell more longitudinal and interventional studies are needed to elucidate relationship more clearly.



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Source of Support: Nil. **Conflict of Interest:** None Declared.

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Cite this article as: Jasmeet Singh, KMDS Panag, Gitanjali, Anil Batta, SK Bansal, Vimal. A Comparative Study of Vitamin D Levels in Adult Asthma as Compared to Normal Controls in Patients Attending Tertiary Care Hospital in Faridkot. Int J Med Res Prof. 2016; 2(4):31-32.