

## Study of Vitamin D levels in asthma at tertiary care Centre

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### ABSTRACT

**Background:** Bronchial asthma is one of the common chronic diseases & leading cause of morbidity worldwide. (1,2). The predominance of asthma is about 300 million people worldwide. In India, load of asthma is more than 30 million. It has 66% frequency of reported exacerbations. Vitamin D has action on pro-inflammatory mediators and smooth muscle function and proliferation, which has direct relevance for lung function in asthma.

**Material & Methods:** The observational study was done in Government Medical College Datia MP from June 2019- December 2019. 60 Patients of 18-60 years with diagnosis of bronchial asthma on the basis of clinical and radiological signs were included, while age matched 60 controls years free from any disease and morbidity were included and assessed for vitamin D levels.

**Results:** The mean serum vitamin D level was significantly low at  $24.13 \pm 4.91$  ng/ml in patients, while  $38.67 \pm 4.03$  ng/ml was the mean vitamin D level of controls. The vitamin D levels of mild and moderate (persistent) asthma patients was seen lower than those of the controls.

**Conclusions:** Vitamin D deficiency is highly prevalent in patients during exacerbations of bronchial asthma. It is also associated with lower lung functions and increased number of exacerbations. Thus vitamin D supplementation may be effective in the prevention and treatment of bronchial asthma and exacerbations.

**Keywords:** Bronchial asthma, Vitamin D deficiency, Exacerbation

### Introduction-

Bronchial asthma is one of the common chronic diseases known to be the leading cause of morbidity worldwide (1,2). The common respiratory symptoms include wheeze, shortness of breath, chest tightness, and cough that vary over time and in intensity, together with variable expiratory airflow limitation. Hypoxia and hypercapnia is the primary feature of asthma severity. The predominance of asthma is about more than 300 million worldwide. In India, the estimated load of asthma is more than 30 million. An estimated population of 300 million is affected by the disease. Prevalence of asthma ranges between 1% and 16%

of the population globally, with Indian population reporting to have 2.9% prevalence.(3) In recent times, Asthma and serum vitamin D deficiency present throughout the world.(4)

There is increasing number of studies related to the therapeutic benefits of vitamin D in patients with asthma. There exists a clear relationship between vitamin D deficiency and poorly controlled asthma.(5)It has been reported that there is a relationship between vitamin D deficiency and increase in the severity of the asthma with increased inflammation.(6)Some studies have stated that vitamin D supplementation has reduced severe asthma attacks other studies have reported that asthma attacks requiring steroid treatment have significantly reduced with the supplementation of vitamin D.(7) Vitamin D receptors expressed in multiple lung cell and acts to protection from asthma by several mechanisms affecting inflammation, promoting lung immunity and slowing cell cycling hyperplasia.(8)

The objective of study is to determine association between low serum levels of vitamin D and presence of asthma and to determine serum vitamin D levels in patients of bronchial asthma and compare it with controls.

### **Material & Method**

The observational study was done in Government Medical College Datia for a period of 6 month from June 2019 -December 2019.

Total 60 patients of 18-50 years with clinical diagnosis of bronchial asthma . Chest x ray were done in all patient .All patient were sputum negative for AFB. Bronchial asthma diagnosis was confirmed by spirometry.

Patients having comorbid diseases that could affect vitamin D levels such as ulcerative colitis, Crohn's disease, osteomalacia, cystic fibrosis and thyroid dysfunction were excluded from the study. Controls were healthy subjects of age 18-50 years .Serum vitamin D levels of Asthmatic and normal control patient were measured & clearly defined . Data were analyzed using SPSS-19 version (SPSS for windows).

### **Results-**

This study was done in 120 subjects, within the age-group of 18 to 50 years. Out of the 60 controls, 21 were females (35%), while in 60 asthmatic cases, 27 were females (45%) (Figure 1).

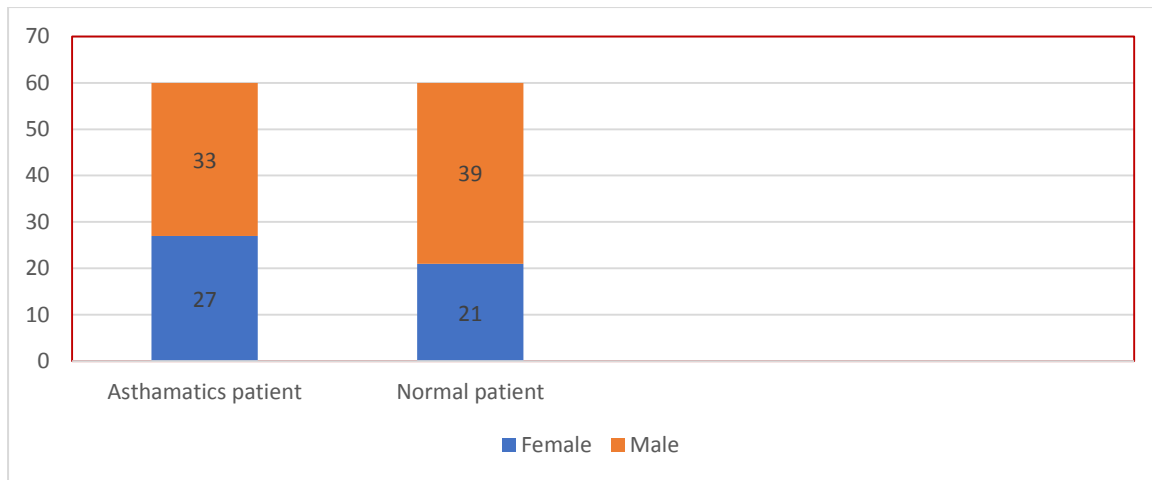
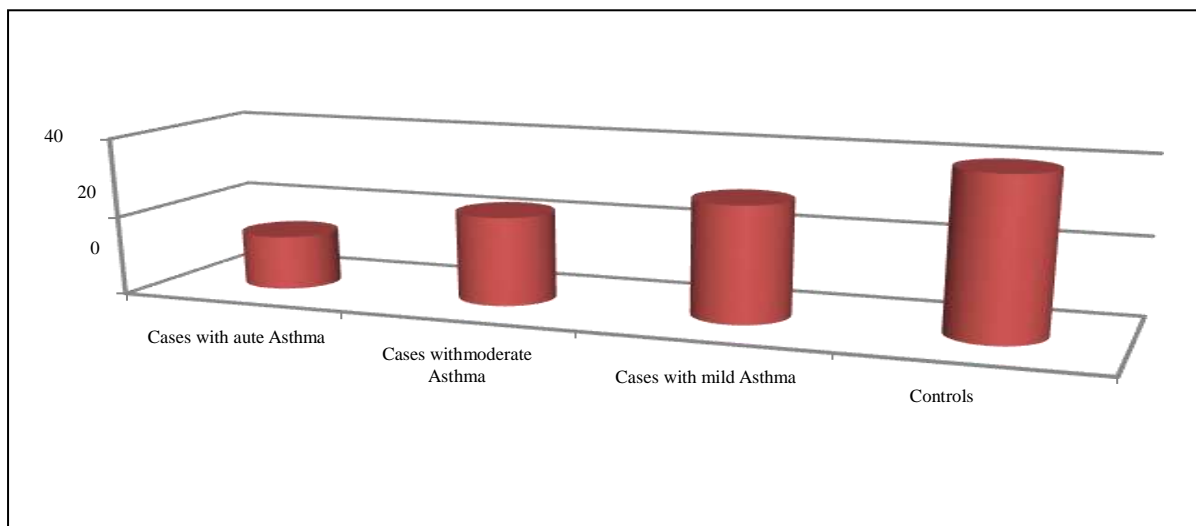


Chart-1, Male to female ratio in case (Total-60 Asthmatics patient) & control (Total -60 normal patient)

Increased incidence of Asthma among females with low vitamin D show their vulnerability. The mean serum vitamin D level was significantly low at  $24.13 \pm 4.91$  ng/ml in patients, while  $38.67 \pm 4.03$  ng/ml was the mean vitamin D level of controls. Significant correlation was observed in between vitamin D level and Asthma severity , as similar difference was also observed between the controls and patients with mild and moderate asthma . low level of vitamin D in mild and moderate (persistent) asthma



patients was seen than controls (Figure 2).

Chart-2 ,Mean Vitamin D level

No significant correlation could be seen in between vitamin D levels and gender in this study.

**Table 1: Serum 25(OH)D concentrations and health status.**

Vitamin D status		
<b>Normal (sufficient)</b>	30-50ng/ml	75-125 nmol/l
<b>Insufficient</b>	20-29ng/ml	50-75 nmol/l
<b>Deficient</b>	<20ng/ml	<50 nmol/l
<b>Severely deficient</b>	<12ng/ml	<30 nmol/l

**Table 2: Classification of vitamin D deficiency.**

Type of deficiency	Range
Severe hypovitaminosis D	<5 ng/ml
Moderate hypovitaminosis D	5-10 ng/ml
Mild hypovitaminosis D	10-15 ng/ml

**Discussion-**

Vitamin D has a significant impact on immunity and cell functions of respiratory system. Lung epithelial cells can synthesize active vitamin D by 1 alpha hydroxylase .

Hejazi et al demonstrated the association between lower vitamin D levels in many lung diseases including respiratory tract infections COPD, tuberculosis and bronchial asthma.(9)However, Korn et al stated the same in their study of association between vitamin D deficiencies with asthma exacerbations.(10)Samarah et al and EI Aaty et al study also demonstrate a significant difference in vitamin D levels between asthmatics and healthy controls.(11,12)Studies have often established association between serum vitamin D levels and asthma incidence.(13) However there was an increased frequency in children (cases with lower age group) with decreased levels of vitamin D. Many studies have also gone on to show a progressive but negative relation of decreasing vitamin D levels with the severity of asthma.(14) Present study is similar to above studies showed low mean serum vitamin D levels in patients as compared to controls. Asthmatics spend more time

indoors and thus have less physical activity, less exposure to sunlight, which may be the confounding factor and corresponding limitation.

### **Conclusion-**

Vitamin D deficiency is high during exacerbations of bronchial asthma. It is also associated with lower lung functions and increased number of exacerbations. Thus improving vitamin D status may be effective tool for prevention and treatment of bronchial asthma and exacerbations. Asthmatic patients can be educated regarding the importance of physical activity, intake of vitamin D rich food, along with exposure to sunlight for better management and routine care.

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