

ORIGINAL RESEARCH

Evaluation of Status of Vitamin D Among Patients Admitted with Acute Exacerbation of COPD: An Institutional Based Study

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ABSTRACT

Background: Vitamin D is now recognized for more than just its importance in regulating calcium and phosphorus in the human body. In the last decade, great interest has been shown of its actions in other systems. Hence, the present study was conducted to assess the status of vitamin D among patients admitted with Acute exacerbation of COPD. **Materials & Methods:** 120 subjects who were diagnosed as having COPD were included as controls. Serum vitamin D(25-OH-Vitamin D) of these subjects were carried out. **Results:** In the present study maximum COPD subjects with acute exacerbation were of age group ≥ 60 years i.e. 39.16% followed by < 55 years (32.5%). Maximum COPD subjects with acute exacerbation were males (79.16%). 72.5% COPD subjects with acute exacerbation had Vitamin D levels ≤ 20 (deficiency). 27.5% subjects had normal Vitamin D levels. **Conclusion:** The present study showed that in maximum COPD subjects with acute exacerbation had Vitamin D levels ≤ 20 and therefore it can be concluded that low Vitamin D levels were associated with COPD with acute exacerbations.

Keywords: COPD, Acute Exacerbation, Vitamin D levels.

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is characterized by a persistent airflow limitation and an abnormal inflammatory response of the airways. COPD is predicted to be the third worldwide cause of mortality by 2020.¹ The most frequent symptoms are sputum production, shortness of breath and a productive cough. Acute exacerbations – a sudden worsening of symptoms – are also manifestations of the disease. Most exacerbations are believed to be triggered by viral and bacterial respiratory infections.² Vitamin D is currently of great public health interest, because its deficiency is common and is causally associated with musculoskeletal diseases. Half of the world's population is affected by vitamin D insufficiency.^{3,4} Moreover, meta-analyses of individual participant data (IPD) from randomised controlled trials (RCTs) have shown that vitamin D supplementation reduces risk of acute respiratory infections and exacerbations of asthma.^{5,6} Taken together, these lines of evidence suggest a potential role for vitamin D supplementation in prevention of

COPD exacerbations.⁷ A single center randomized trial on 182 COPD patients demonstrated that vitamin D supplements were able to reduce COPD exacerbations only in the 30 subjects with severe deficiency.⁸ Hence, the present study was conducted to assess status of vitamin D among patients admitted with Acute exacerbation of COPD.

MATERIALS AND METHODS

The present study was conducted to assess the status of vitamin D among patients admitted with Acute exacerbation of COPD in Department of Medicine, Varun Arjun Medical College & Rohilkhand Hospital, Shahjahanpur, Uttar Pradesh, India. Before the commencement of the study, ethical clearance was taken from the ethical committee of the institute and informed consent was taken from the subjects after explaining them the study. All men and women aged 30 years and above were included in the study. 120 subjects who were diagnosed as having COPD according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria were

included in the study. Exacerbation of COPD was defined as change in symptoms more than expected diurnal variation which necessitated additional clinical intervention including prescription of additional medications which includes antibiotics or systemic steroids or both.⁹ Serum vitamin D (25-OH-Vitamin D) levels from these subjects were carried out by chemi-immuno-luminescence assay (CLIA) method [Roche, Basel, Switzerland]. Vitamin D levels of <20ng/ml was defined as vitamin D deficiency according to US Endocrine Society Guidelines.¹⁰

RESULTS

In the present study maximum COPD subjects with acute exacerbation were of age group ≥ 60 years i.e. 39.16% followed by <55 years (32.5%). Maximum COPD subjects with acute exacerbation were males (79.16%).

72.5% COPD subjects with acute exacerbation had Vitamin D levels ≤ 20 (deficiency). 27.5% subjects had normal Vitamin D levels.

Table 1: Demographic characteristics of COPD subjects with acute exacerbation.

Variables	COPD subjects with acute exacerbation (n=120)
Age group (yrs)	
<55	39(32.5%)
56-60	34(28.33%)
≥ 60	47(39.16%)
Gender	
Females	25(20.83%)
Males	95(79.16%)

Table 2: Vitamin D levels in COPD subjects with acute exacerbation

Vitamin D levels ng/mL	COPD subjects with acute exacerbation (n=120)
>20	33(27.5%)
≤ 20 (deficiency)	87(72.5%)

DISCUSSION

As acute exacerbations in COPD are often triggered by viral or bacterial infections, the ability of Vitamin D to enhance cathelicidin expression might reduce pathogen load and the frequency of these exacerbations.^{11,12}

In the present study maximum COPD subjects with acute exacerbation were of age group ≥ 60 years i.e. 39.16% followed by <55 years (32.5%). Maximum COPD subjects with acute exacerbation were males (79.16%). 72.5% COPD subjects with acute exacerbation had Vitamin D levels ≤ 20 (deficiency). 27.5% subjects had normal Vitamin D levels.

Lokesh KS, et al did a study and found that Vitamin D deficiency was observed in 64.5% (95%CI 57.7–70.8) of the subjects in spite of regular exposure to sunlight. Subjects with COPD had higher risk of Vitamin D deficiency (Adjusted OR: 5.05; 95%CI 1.4–17.8) as compared to controls. Among subjects with COPD, Vitamin D deficient subjects were 3 times more likely to have exacerbations in the previous year (Adjusted OR: 3.51; 95%CI 1.27–9.67) as compared to COPD subjects without Vitamin D deficiency. Levels of Vitamin D below 20.81 ng/ml and below 18.45 ng/ml had the highest levels of combined sensitivity and specificity for COPD and exacerbations respectively.¹³

Khan DM, et al did a study and concluded that Vitamin D supplementation has significant effect in reducing number of acute exacerbation in COPD patients when it is given for prolonged period.¹⁴

Evgeni Mekov, et al in the study, found that 83.6% of patients have reduced levels of vitamin D. 42.8% have

vitamin D insufficiency (defined as 25-50 nmol/L) and 40.8% have vitamin D deficiency (<25 nmol/L). The mean level of 25(OH)D is 31.97 nmol/L (95%CI 29.12–34.68). Vitamin D deficiency and insufficiency are more prevalent in females (97.7 vs 77.8%; $p=0.003$). The prevalence and severity of vitamin D deficiency and insufficiency in this study is significantly higher when compared to national representative study (prevalence 75.8%; mean level 38.75 nmol/L). Vitamin D correlates with quality of life (mMRC) and lung function (FVC, FEV1, FEV6, FEF2575, FEV3, but not with FEV1/FVC ratio and PEF), but does not correlate with the presence of arterial hypertension, DM, MS and number of moderate, severe and total exacerbations. Vitamin D deficiency is a risk factor for longer hospital stay. The study concluded that the patients with COPD admitted for exacerbation are a risk group for vitamin D deficiency and insufficiency which are associated with worse disease characteristics.¹⁵

CONCLUSION

The present study showed that in maximum COPD subjects with acute exacerbation had Vitamin D levels ≤ 20 and therefore it can be concluded that low Vitamin D levels were associated with COPD with acute exacerbations.

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