

## Clinical Correlation of Copd Assessment Test (Cat) Questionnaire with Severity in Acute Exacerbation of Chronic Obstructive Pulmonary Disease

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### **Abstract:**

**Background:** COPD is a disease that causes a lot of human suffering. The exacerbations of COPD add to the morbidity and mortality. The COPD assessment test (CAT) questionnaire is an eight item questionnaire that assesses the impact of COPD on the health status. We evaluated CAT score in a group of patients with acute exacerbation of COPD as a marker for COPD exacerbation and severe disease.

**Objectives:** To assess usefulness of CAT questionnaire as early markers for assessment of exacerbation risk and exacerbation severity.

**Methods:** 100 patients with acute exacerbation of COPD were studied between November 2012 to October 2014. Assessment of symptom severity was made based on the CAT questionnaire. They were subjected to investigations like Hb, TC, DC, ESR, RBS, Blood urea, Serum creatinine, ECG, chest X-ray, ABG, pulmonary function tests (pre and post bronchodilator therapy), 2 D ECHO (if necessary).

**Results:** Frequent exacerbators had significantly higher CAT scores than infrequent exacerbators. ( $p < 0.005$ ). Patients with severe stage of the disease (as GOLD criteria) had very high CAT score.

**Conclusion:** The CAT provides a reliable score of exacerbation severity. CAT scores are elevated in frequent exacerbators.

**Keywords:** chronic obstructive pulmonary disease; exacerbations; severity

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### I. Introduction

Chronic obstructive pulmonary disease (COPD) is a disorder that causes a huge degree of human suffering<sup>1</sup>. It is currently the fourth leading cause of death worldwide. Exacerbations and co morbidities contribute to the overall severity, morbidity and mortality in individual patients.<sup>2,3</sup> According to new estimates for 2030, COPD is predicted to become the third leading cause of death.<sup>4</sup>

It is a disorder characterised by episodes of exacerbations that can lead to hospitalisation. These exacerbations lead to worsening of symptoms which affect the recovery time.<sup>5</sup> Thus, markers of exacerbations would be useful to predict the clinical course of the disease.

A reliable method to assess exacerbation is the COPD Assessment Test (CAT). It is a validated 8-item questionnaire completed by patients, designed to provide an assessment of health status in COPD.<sup>6</sup>

This questionnaire facilitates fact based dialogue between physician and patient to improve their mutual understanding of the disease's impact<sup>7, 8</sup>. It covers a broad range of effects of the disease on patient's health and provides a reliable measure of overall COPD severity from the patient's perspective. It not only addresses respiratory or chest related symptoms, but also more general complaints such as disturbances in sleep or decreased energy levels and daily limitations resulting from the disease.

As new agents are being developed with specific goals of reducing exacerbation frequency or severity, the CAT should be examined to see if it can predict who may be good candidates for such agents.<sup>9</sup>

This study was aimed to see if CAT questionnaire could be used as auxiliary markers other than spirometry in determining severity of COPD and better control of disease prognosis in patients with exacerbations.

### II. Materials And Methods

This was a descriptive cross-sectional study which was performed on COPD patients who were referred to Kempegowda Institute of Medical Sciences, Bangalore, India, because of COPD exacerbation during 2012-2014. COPD patients whose diseases were diagnosed by specialists and confirmed by spirometry (as gold criteria) entered the survey.

They were excluded if their diseases were not confirmed by FEV1/FVC<70% or FEV1/VCmax<70% in Pulmonary Function Test (PFT).

Data were collected on patients' demographic characteristics, co-morbidities (hypertension, congestive heart failure, diabetes mellitus, hyperlipidaemia) by history, physical examination and echocardiography, smoking habits and number of exacerbations in a year.

They were subjected to investigations like Hb, TC, DC, ESR, RBS, Blood urea, Serum creatinine, ECG, chest X-ray, ABG, pulmonary function tests(pre and post bronchodilator therapy), 2 D ECHO( if necessary).

Assessment of symptom severity was made based on the CAT questionnaire.

Data were analysed using descriptive statistics (e.g. percentage and mean) and comparing means (Pearson's correlation tests). P<0.05 was considered significant.

### III. Results

In this study, 100 known COPD patients with exacerbation were assessed.

Their mean age of sample was 65.23 years. Among them, 97 were males and 3 were females.

Regarding severity of disease according to GOLD criteria, fifty two patients (52%) were in stage II, 40 of them were in stage III and 8 in stage IV with a mean FEV1 of 49.96%.

Among the samples, 62% of the patients showed hypoxemia, with a mean PaO<sub>2</sub> level of 58.66 mmHg. (PO<sub>2</sub> 40-60 mmHg) and most of them showed PaCO<sub>2</sub> levels> 45 mmHg (53%).

Patients were grouped according to the CAT score as moderate, high and very high, the scores being (10-20), (21-30) and (>30), respectively. 13% of the patients had a moderate CAT score. 35 % had high scores, whereas, it was very high in 52% of the patients as shown in Fig 1

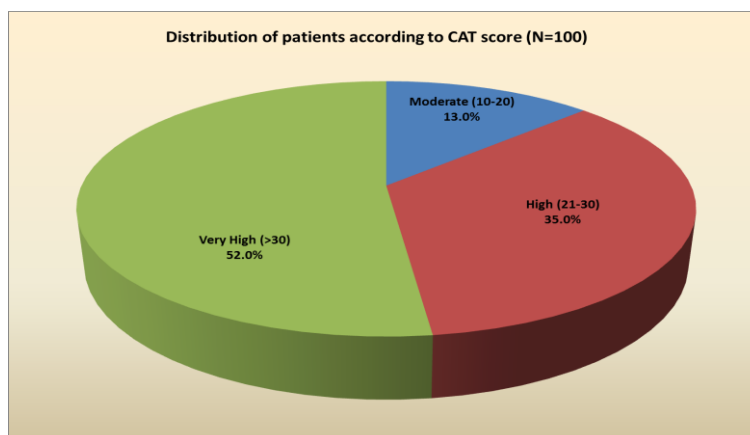


Figure 1: Showing distribution of patients according to CAT score

The CAT score had a positive correlation with the stage of the disease. Patients with very high CAT score had lower FEV1 values (P<0.001) as shown in fig 2.

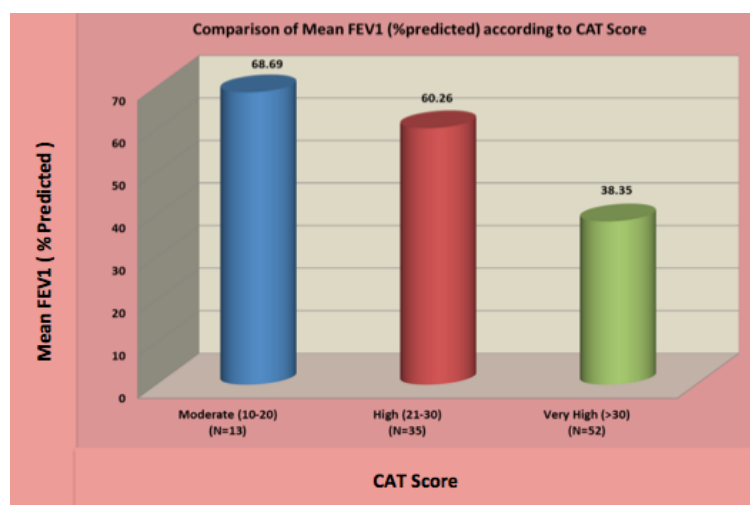


figure 2: Comparison of mean FEV1 according to CAT score

Considering the number of exacerbations per yer, it was seen that patients with increased CAT score, had more exacerbations. ( $p < 0.001$ ) (fig 3)

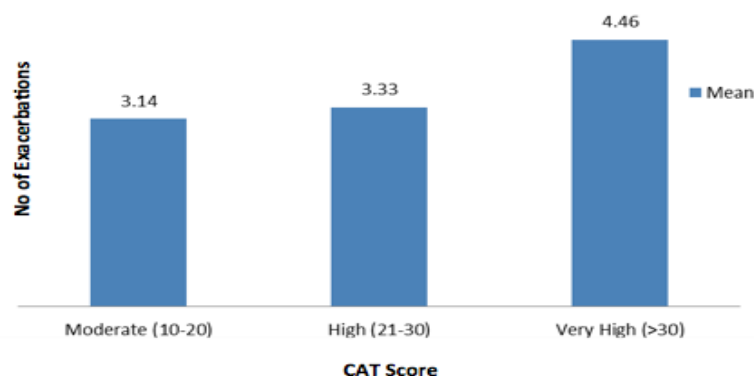


figure3: CAT score and number of exacerbation

#### IV. Discussion

The current study assessed the usefulness of CAT to evaluate exacerbation severity in patients with acute exacerbation of COPD.

Previous studies have shown the application of CAT with respect to pulmonary rehabilitation and different levels of response.<sup>10-12</sup>

A novel finding in our study was the significant correlation between CAT score and the stage of the disease ( $p < 0.001$ ). This finding is consistent with that seen in a study done by Alex J.Mackay,et al (2012), which showed that patients with severe COPD showed significantly higher CAT score ( $p < 0.032$ )<sup>6,13</sup>.

Our study also found a positive association between CAT score and the number of exacerbations in the past years ( $p < 0.001$ ). This has been proved in another study done by Alex J.Mackay. et al (2012), which concluded that frequent exacerbators had significantly higher baseline CAT scores than infrequent exacerbators<sup>6</sup>. This finding implies that patients with frequent exacerbations have poor quality of life, poor functional status and greater morbidity.

#### V. Conclusion

Thus, CAT questionnaire is an instrument which focuses on different areas of respiratory health in COPD patients, thus providing a useful and objective tool for the long-term clinical and therapeutic monitoring of COPD patients in the specialist outpatient setting. The deterioration of overall health of the patient, as a result of exacerbation can be assessed using CAT questionnaire.

Thus, we have shown that CAT is a reliable cost effective tool in assessing exacerbation severity. It can be rapidly completed in health care setups, in order to provide the required treatment for individuals with higher CAT score.

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