



## SEVERITY DISTRIBUTION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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**ABSTRACT** **Background:** COPD is a common disease with steadily increasing prevalence, morbidity, mortality and costs of treatment. There is a powerful association between use of healthcare services and disease severity. This study assessed the current severity distribution and the clinical characteristics of each stage of COPD.

**Materials and method:** Cross sectional observational study in 200 patients with spirometry confirmed COPD. The percentage of COPD patients in each GOLD stage is assessed and its clinical characteristics analysed in subgroups.

**Result:** Among 200 confirmed COPD; distribution of each stage identified as mild 15 (7.5%), moderate 105 (52.5%), severe 55 (27.5%) and very severe 25 (12.5%).

**Conclusion:** Closer attention to respiratory symptoms for early detection, diagnosis, and treatment of COPD is needed. To prevent COPD related disability and mortality; efforts must focus on prevention and cessation of smoking.

**KEYWORDS :** COPD severity classification. GOLD

### Introduction:

The actual burden of chronic obstructive pulmonary disease (COPD) in terms of health care use strongly depends on the distribution of disease severity. The distribution of COPD severity was estimated by classifying all patients with COPD into mild, moderate, severe and very severe COPD according to their post-bronchodilator FEV<sub>1</sub> % predicted based on the GOLD-guidelines. This distribution will most likely shift to the less severe stages when under-reporting and under-diagnosis are reduced. The actual burden in terms of costs strongly depends on the severity distribution of COPD in the population, as there is a powerful association between use of healthcare services and disease severity. However, recent epidemiological estimates of severity distribution of COPD in the population differ depending on the population studied and methods used<sup>1</sup>. It is necessary to know the current distribution of COPD disease severity. This study aimed to assess the severity distribution of COPD and its clinical characteristics.

department of pulmonary medicine, medical college, Thrissur, Kerala in 200 patients with COPD who visits the OPD of pulmonary medicine. Inclusion criteria were COPD subjects aged 40 – 90 years with a smoking history of more than 10 pack-years with post-bronchodilator FEV<sub>1</sub>/FVC ratio <0.7. Patients with asthma, malignancy, exacerbation COPD, ischemic heart disease, uncontrolled hypertension, heart failure were excluded. After careful history and physical examination; COPD was confirmed by pulmonary function tests. Post bronchodilator FEV<sub>1</sub> /FVC ratio was taken to confirm COPD. The percentage of COPD patients in each GOLD stage is assessed and its clinical characteristics analysed in subgroups in each stage. Institutional ethical committee approval was obtained and informed consent was taken from all patients. This distribution will most likely shift to the less severe stages when under-reporting and under-diagnosis are reduced. The estimation may be an indicator for appropriate corrective strategies.

### Materials and Methods:

This cross sectional observational study was conducted in the

### Results

Baseline demographics and clinical characteristics are given in table.1

| Patient characteristics of COPD |                      |                        |                        |                        |                    |         |
|---------------------------------|----------------------|------------------------|------------------------|------------------------|--------------------|---------|
|                                 | COPD                 | Mild                   | Moderate               | Severe                 | Very severe        | P value |
| Total number n(%)               | 200 (100%)           | 15(7.5%)               | 105(52.5%)             | 55(27.5%)              | 25(12.5%)          |         |
| Mean age (years)                | 64.6                 | 58                     | 65.2                   | 65.2                   | 64.8               | 0.430   |
| Age groups                      |                      |                        |                        |                        |                    |         |
| 40-49 yrs                       | 5 (2.5%)             | -                      | -                      | -                      | -                  |         |
| 50-59                           | 45 (22.5%)           | 5 (33.3%)              | 25 (23.8%)             | 15(27.3%)              | -                  |         |
| 60-69                           | 105 (52.5%)          | 5 (33.3%)              | 50 (47.6%)             | 30(54.5%)              | 20(80%)            |         |
| 70-79                           | 40 (20%)             | 5 (33.3%)              | 25 (23.8%)             | 10(18.2%)              | 5 (20%)            |         |
| >80                             | 5(2.5%)              | -                      | 5 (4.7%)               | -                      | -                  |         |
| Gender M/F n (%)                | 170(85%)/<br>30(15%) | 5(33.3%)/<br>10(66.7%) | 95(90.5%)/<br>10(9.5%) | 50 (90.9%)/<br>5(9.1%) | 20(80%)/<br>5(20%) | 0.067   |
| Smoking history                 |                      |                        |                        |                        |                    |         |
| Smoker                          | 170(85%)             | 5(33.3%)               | 95(90.5%)              | 50(90.9%)              | 20(80%)            | 0.067   |
| Never smoker                    | 30(15%)              | 10(66.6%)              | 10(9.5%)               | 5(9.1%)                | 5(20%)             |         |
| Mean BMI Kg/m <sup>2</sup>      | 20.7                 | 23.8                   | 20.4                   | 19.6                   | 21.9               | 0.518   |
| FEV <sub>1</sub> % pred Pre BD  | 43.3                 | 75.7                   | 48.7                   | 32.5                   | 24.8               | 0.001   |
| FEV <sub>1</sub> % pred post BD | 49.0                 | 81.3                   | 55.1                   | 38.7                   | 26.6               | 0.001   |
| FVC % pred pre BD               | 62.0                 | 82.7                   | 69.4                   | 50.6                   | 43                 | 0.001   |
| FVC % pred post BD              | 72.2                 | 86.67                  | 79                     | 64.3                   | 52.2               | 0.001   |

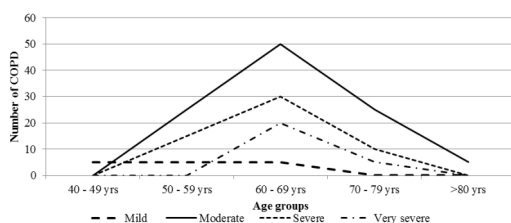


Figure 1: Graph showing age group wise distribution of severity of COPD

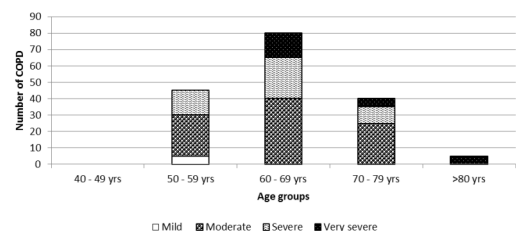


Figure2: Severity distribution of COPD in smokers

## Discussion

Chronic Obstructive Pulmonary Disease (COPD) is a respiratory syndrome associated with a progressive, non reversible limitation to airflow and abnormal inflammatory responses involving the small airways<sup>[1]</sup>. Current diagnosis of COPD involves an assessment of smoking and occupational history as well as recording of symptoms such as cough, sputum and dyspnea. However, due to poor public awareness of this disease and the overlap of symptoms with other co morbidities, many patients are not diagnosed until later when the disease has made a significant impact on their quality of life<sup>[2-4]</sup>. For many years, spirometry has been the only means of confirming and classifying severity of airflow obstruction<sup>[5,7,11]</sup>.

Stages of COPD based on post bronchodilator FEV<sub>1</sub>(GOLD)

Stage I: Mild COPD: Mild airflow limitation (FEV<sub>1</sub>/FVC < 70%; FEV<sub>1</sub> > 80% predicted) and sometimes, but not always, chronic cough and sputum production. At this stage, the individual may not be aware that his or her lung function is abnormal.

Stage II: Moderate COPD: Worsening airflow limitation (FEV<sub>1</sub>/FVC < 70%; 50% < FEV<sub>1</sub> < 80% predicted), with shortness of breath typically developing during exertion. This is the stage at which patients typically seek medical attention because of chronic respiratory symptoms or an exacerbation of their disease.

Stage III: Severe COPD: Further worsening of airflow limitation (FEV<sub>1</sub>/FVC < 70%; 30% < FEV<sub>1</sub> < 50% predicted), greater shortness of breath, reduced exercise capacity, and repeated exacerbations which have an impact on patient's quality of life.

Stage IV: Very Severe COPD: Severe airflow limitation (FEV<sub>1</sub>/FVC < 70%; FEV<sub>1</sub> < 30% predicted). At this stage, quality of life is very appreciably impaired and exacerbations may be life threatening

Most of COPD patients studied were in 60 - 69 age group (52.5%) followed by 50 - 59 age group (22.5%); 40 - 49 age group(2.5%) and greater than 80 age group (2.5%). Age group greater than 80 years had least number of subjects. After the age of 80 years in men and in women, the COPD prevalence did no longer increase and even gradually declined. Although the exact mechanism is unknown, this could be explained by the "healthy survivor effect", where patients with COPD die before the age of 80.

In present study; among 200 patients with spirometry confirmed COPD 15(7.5%) were in mild stage,105(52.5%) were in moderate stage,55(27.5%) were in severe stage and 25(12.5%) were in very severe GOLD stage. This study showed that in total,60% of the patients with a physician diagnosis of COPD had mild to moderate disease whereas almost 40% had severe to very severe COPD. This represent physician diagnosed COPD patients fairly well. COPD severity distribution in the entire community needs corrective strategies against under-reporting and under-diagnosis and better utilization of spirometry assessment.

Mean age in mild stage was lower than all other stages. Mean age of mild, moderate and severe and very severe were 58, 65.2, 65.2, 64.8 respectively. Gender association in severity distribution of COPD was noted .Mild stage COPD was more than twice as frequent in women than in men (67% and 33% respectively).Except in mild stage all other stages showed male gender differences. In moderate stage 90.5% were males against 9.5% females. Severe stage included 91% males and 9% females. Very severe had 80% males with 20% females.

Smoking is related with the stage of disease as evidenced. Mild stage COPD was seen in 33.3% of non smokers cohort against 7.5% of smokers. Moderate stage was there in 33.3% of non smokers against 52.5% of smokers. Severe and very severe stage was seen in 33.4 % of non smokers against 40% of smokers.

BMI differences between stages of COPD were note. In mild stage mean BMI was 23.8 Kg/m<sup>2</sup>

In modrate stage mean BMI was 20.4 Kg/m<sup>2</sup> and in severe stage mean BMI was 21.9 Kg/m<sup>2</sup>.

Earlier diagnosis may allow identification of milder cases that could be better controlled and appropriately treated. There is a highly

significant relationship exists between severity of disease and costs of treatment. Costs for severe disease were 3 times as high as costs for moderate disease and greater than 10 times as high as for mild disease<sup>[8]</sup>. COPD being a chronic, progressive disease poses a huge economic burden on the patient as well as the health-care systems.<sup>[10]</sup>. The cost-estimate assessed in an ICMR sponsored project in 1998 showed about Rs.2440 as direct per capita expenditure, Rs.1340 on smoking products and Rs.11454 as indirect losses annually. The assessment was however an under estimation. Importantly the costs reflected financial burden of about 30 percent of the patient's income. Undoubtedly, the estimates per patient have enormously risen now with an escalation of costs of medicine, other treatment modalities and of hospitalisation. This remains an important issue of concern for continued assessment, surveillance and audit

More importantly, it is essential to emphasize and adopt measures for reduction of risk factors particularly tobacco-smoking and air pollution, both for prevention of disease and occurrence of complications.

However, the disease is largely underdiagnosed without spirometry: only patients with severe disease had been diagnosed and treated. Appropriate steps should be taken in the earlier stages for purposes of prevention of complications and delay of the lung function decline. A failure to appreciate the disease-severity and the onset of respiratory-disability is common in view of the poor availability of spirometric assessment of lung functions.

## Conclusion:

Present study shows the moderate stage as most frequent COPD severity stage seen in a specialist centre. For prevention of disease measures should be taken for reduction of risk factors; tobacco-smoking and air pollution. Spirometric assessment of lung functions for earlier diagnosis may allow identification of milder stages and delay the lung function decline.

## Conflicts of interest: nil

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