

## Obesity and Copd Severity: An Observational Cross-Sectional Study

**Received:** 21 October 2022, **Revised:** 16 November 2022, **Accepted:** 24 December 2022

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### Key Words:

Chronic Obstructive Pulmonary Diseases (COPD), Body Mass Index, Spirometry

### Abstract:

**INTRODUCTION:** COPD is a frequent chronic condition. Although the fact that losing weight is common in individuals with COPD, previous research has shown that approximately 65 percent of COPD patients are overweight or obese.<sup>1</sup> Body mass index is a substantial risk factor for mortality from COPD. However, trustworthy data on stratified weight recommendations for COPD remain scarce. The purpose of this research is to determine the relationship between BMI and COPD severity grades so as to enhance patient care.<sup>2</sup> The study's goal was to determine BMI in persons with COPD.

**AIM:** To investigate BMI in individuals with COPD.

**METHOD AND MATERIAL:** For a duration of one and a half years, an observational cross-sectional study was conducted in our Tertiary Care Centre's Respiratory Medicine department. The study included 102 people over the age of 40 who had COPD according to spirometry (FEV1/FVC <0.7). The complete information provided by patients was attained and analysed using statistical tools.

**RESULTS:** In this study, 102 people participated. The majority of patients (46 in total) were aged 61-70 years. In the research, 35 patients (34.3%) were overweight and 67 (65.7%) had normal BMI. Overweight was seen in 25% of Stage 1 COPD patients, 29% were with Stage 2, 44.4% with Stage 3, and 43.7% with Stage 4.

**CONCLUSION:** These data suggest that the rise in BMI and overweight is associated with an elevation in COPD severity. Stages 3 and 4 of COPD had the largest prevalence of overweight people, based on GOLD staging.

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## 1. Introduction:

COPD is characterised as an irreversible airway restriction for which no other explanation exists. The primary risk factor for the development of COPD includes smoking.<sup>3</sup> The degree of systemic inflammation as well as the absence of physical exercise define the degree of severity of COPD. They are calculated using the aggregate amount of hospitalisations, exacerbations, and deaths.<sup>4</sup>

Overweight and COPD are major causes of morbidity and mortality across the world, and the worldwide burden of both conditions is predicted to climb further in the future years, based on current forecasts. While the GOLD guidelines use pulmonary function tests to diagnose and grade COPD extent, the WHO uses BMI to determine overweight and obesity.<sup>5</sup> Even in the absence of evident lung disease, obese persons are more prone to experience breathing difficulties than people with a normal BMI. According to research, obese people had a higher incidence of self-reported dyspnea and wheezing at rest and during exercise than lean people.<sup>6</sup>

Obesity is a major health problem that has been related to a variety of life-threatening illnesses. The organization's future is unknown. Obesity is more common in those with decreased lung function. This might be connected to one among three things: (1) COPD patients' difficulty breathing whilst exercising often result in a reduced level of exertion and thus lesser calories burned via exercise; (2) Increased body weight is a common side effect related to long-term glucocorticosteroid medicines; and (3) Individuals who have COPD lack the capacity to benefit from oxygen to facilitate the breakdown of the fatty acids via beta oxidation because they are hypoxemic both at rest and when they exercise. Without this system, their bodies are unable to adequately utilise fat as a source of energy during bouts of aerobic activity, forcing their cells to resort to less effective methods of energy generation via anaerobic pathways.<sup>7</sup>

## 2. Materials and Methods:

**Study Site:** Respiratory Medicine department in Dhiraj Hospital, Pipariya

**Study Population:** Patients with COPD attending to Respiratory Medicine department.

## OBJECTIVES:

1. To Determine the prevalence of BMI in COPD patients.
2. Correlation of COPD severity as per GOLD criteria with BMI

## **INCLUSION CRITERIA**

- Age group >40 years.
- Patients who are willing to provide written consent.
- Patients diagnosed with COPD on the basis of history, pulmonary function test

(FEV1/FVC <0.7), clinical examination and GOLD guidelines

## **EXCLUSION CRITERIA**

- All Patients refusing to give written consent
- Presence of any comorbidities which will prevent the completion of the study like malignancy.
- Patients with new sputum positive pulmonary tuberculosis.
- Patients with an exacerbation of COPD (purulent sputum production within the past 3 weeks, increasing shortness of breath, increase in cough) which will require admission in the Intensive Care Unit.
- All patients with Recent Myocardial Infarction.
- All patients with Refractory Hypoxemia on steroid.

**Study Design:** An Observational cross-sectional study

**Study Duration:** One and Half years

## **Data Collection**

The study included 102 COPD patients who were diagnosed using GOLD standards, including a history, clinical examination, and spirometry. All patients' detailed histories and demographic data were collected, and relevant clinical examinations were performed. BMI was measured for comparison.

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The severity of disease has been assessed based on the airflow limitation classification as in the GOLD guidelines.

| STAGE   | SEVERITY    | POST BRONCHODILATOR (FEV1) |
|---------|-------------|----------------------------|
| GOLD-1  | MILD        | FEV1 > 80% Predicted       |
| GOLD- 2 | MODERATE    | 50% ≤ FEV1 < 80% Predicted |
| GOLD- 3 | SEVERE      | 30% < FEV1 < 50% Predicted |
| GOLD- 4 | VERY SEVERE | FEV1 ≤ 30% Predicted       |

### Statistical Methods

Microsoft excel sheet was used for data entry and analysis was done using software version SPSS 22.

**Graphical representation of data:** MS word and MS Excel was used to obtain various types of graphs such as bar diagram, Pie diagram and Scatter plots.

**Statistical software:** MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY,

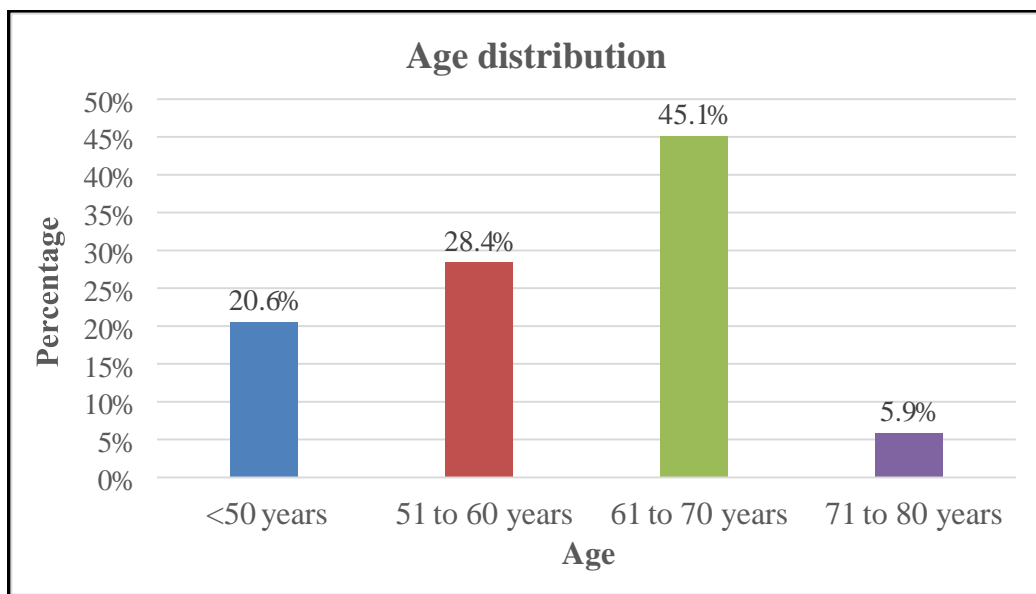
USA) was used to analyse data.

### 3. Results:

**Table 1:** The age distribution of COPD patients

|     |                | Count | %      |
|-----|----------------|-------|--------|
| Age | <50 years      | 21    | 20.6%  |
|     | 51 to 60 years | 29    | 28.4%  |
|     | 61 to 70 years | 46    | 45.1%  |
|     | 71 to 80 years | 6     | 5.9%   |
|     | Total          | 102   | 100.0% |

The average age range was  $59.81 \pm 8.44$  years. Many people (45.1%) were between the ages of 61 and 70.

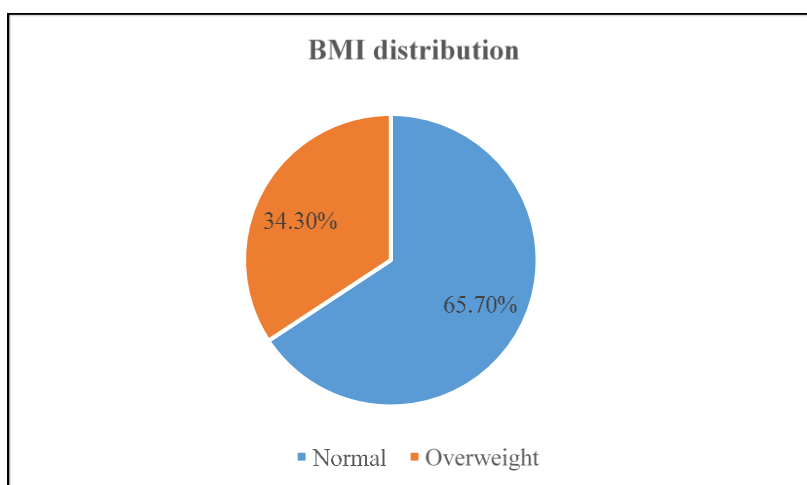


**Figure 1:** A bar graph depicting the age distribution of COPD patients is shown.

**Table 2:** BMI distribution among Subjects with COPD

|            |            | Count | %     |
|------------|------------|-------|-------|
| <b>BMI</b> | Normal     | 67    | 65.7% |
|            | Overweight | 35    | 34.3% |

The average BMI of the patients in the research was  $23.03 \pm 2.59$ , with the majority of subjects (65.7%) having normal BMI and 34.3% having overweight BMI.



**Figure 2:** Pie diagram showing BMI distribution among Subjects with COPD

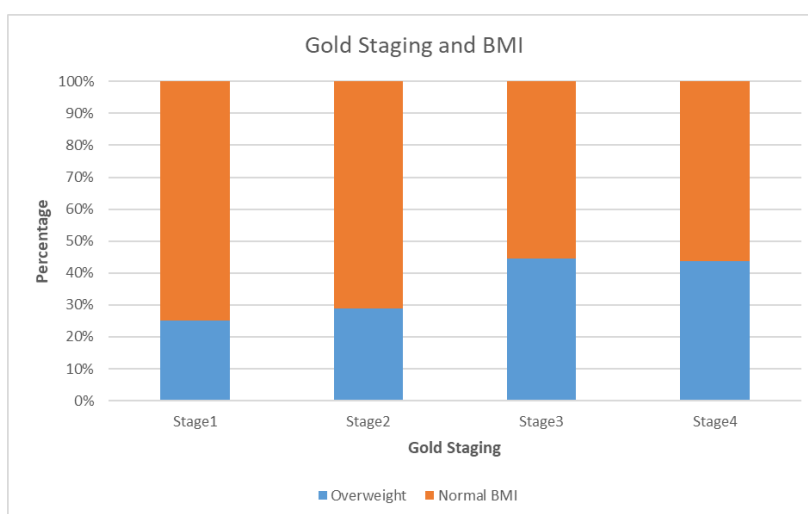


**Table 3:** Gold staging distribution among Subjects with COPD having overweight and normal BMI

|                          |         | Total | %     | Overweight |       | Normal weight |       |
|--------------------------|---------|-------|-------|------------|-------|---------------|-------|
| <b>COPD Gold Staging</b> | Stage 1 | 28    | 27.5% | 7          | 25%   | 21            | 75%   |
|                          | Stage 2 | 31    | 30.4% | 9          | 29%   | 22            | 71%   |
|                          | Stage 3 | 27    | 26.5% | 12         | 44.4% | 15            | 55.6% |
|                          | Stage 4 | 16    | 15.7% | 7          | 43.7% | 9             | 56.3% |

In the research, the total number of patients in Stage 1 was 28 (27.5%), with 7 (25%) being overweight and 21 (75%) being normal. The total number of people in Stage 2 was 31 (30.4%), with 9 (29%) being

overweight and 22 (71%) being normal. Stage 3 patients were overweight 12 (44.4%) and normal weight 15(55.6%), whereas Stage 4 patients were overweight 7(43.7%) and normal weight 9(56.3%).



**Figure 3:** Bar diagram showing GOLD staging distribution among subjects with COPD having overweight and normal BMI

#### 4. Discussion:

Patients above the age of 40 were eligible to participate in our study. The majority of persons were between the ages of 61 and 70. Marquis K et al. observed a similar age distribution.<sup>8</sup>

According to Vujic T et al.,<sup>9</sup> the BMI and mean age of COPD patients were  $24.63 \pm (SD-5.3)$  (kg/m<sup>2</sup>) and  $62.73 \pm (SD-7.26)$  years, respectively. Similarly, in our study, it was  $23.03 \pm 2.59$  kg/m<sup>2</sup> and  $59.81 \pm 8.44$  years.

In our analysis, the majority of patients were in stages two and three of COPD, according to GOLD standards, accounting for about 84.3% of the population. Vujic et al., did a comparable research in which patients in stages two and three made up 80.6% of the study population, lending confirmation to our findings. Stages one and four were 6.1% and 13.3% in his research, respectively, while they were 27.5% and 15.7% in ours. Delays in obtaining medical services and in diagnosing the disease account for a lower number of stage one individuals, whereas increased

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severity of the disease and a higher risk of hospital admission in the ICU account for a higher number of stage four individuals in this study.<sup>9</sup>

Obesity was widespread in the Allison A. Lambert et al. research, a well-characterized cohort of adults with COPD and GOLD stages 2 through 4 severity of airway obstruction, impacting roughly one-third of the population. Obesity severity was connected with worse COPD morbidity. Similarly, in our study, the number of obese people was higher in GOLD stages 3 and 4. That is, obesity increases with the severity of COPD increases.

## 5. Conclusion:

In this day and age, when there is an obesity pandemic, the link between obesity and chronic respiratory disorders like COPD is becoming a daily clinical concern. COPD patients at various phases of GOLD Staging were included in this study and were examined for obesity. Comorbid obesity and COPD are common, and rising weight is connected with rising comorbidities. Although inheritance does play a role in obesity prevention and management, much can be carried out to reduce and lessen many medical as well as respiratory complications.

## References:

- [1] Verberne LD, Leemrijse CJ, Swinkels IC, van Dijk CE, de Bakker DH, Nielen MM. Overweight in patients with chronic obstructive pulmonary disease needs more attention: a cross-sectional study in general practice. *NPJ primary care respiratory medicine*. 2017 Nov 22;27(1):63.
- [2] Huber MB, Kurz C, Kirsch F, Schwarzkopf L, Schramm A, Leidl R. The relationship between body mass index and health-related quality of life in COPD: real-world evidence based on claims and survey data. *Respiratory Research*. 2020 Dec;21(1):1-0.
- [3] O'Reilly S. Chronic Obstructive Pulmonary Disease. *American Journal of Lifestyle Medicine*. 2017 Jul;11(4):296-302.
- [4] Magnussen H, Watz H. Systemic Inflammation in Chronic Obstructive Pulmonary Disease and Asthma: Relation with Comorbidities. *Proceedings of the American Thoracic Society*. 2009 Dec 15;6(8):648-51.
- [5] Franssen FM, O'Donnell DE, Goossens GH, Blaak EE, Schols AM. Obesity and the lung: 5- Obesity and COPD. *Thorax*. 2008 Dec 1;63(12):1110-7.
- [6] Zammit C, Liddicoat H, Moonsie I, Makker H. Obesity and respiratory diseases. *International journal of general medicine*. 2010 Oct 20:335-43.
- [7] Fuller-Thomson E, Howden KE, Fuller-Thomson LR, Agbeyaka S. A strong graded relationship between level of obesity and COPD: findings from a national population-based study of lifelong nonsmokers. *Journal of Obesity*. 2018 Nov 20;2018.
- [8] Marquis K, Maltais F, Duguay V, Bezeau AM, LeBlanc P, Jobin J *et al*. Metabolic syndrome in patients with chronic obstructive pulmonary disease. *J Cardiopulm Rehabil* 2005; **25**:226-232.
- [9] Vujic T, Nagorni O, Maric G, Popovic L, Jankovic J. Metabolic syndrome in patients with chronic obstructive pulmonary disease: frequency and relationship with systemic inflammation. *Hippokratia*. 2016 Apr;20(2):110.
- [10] Lambert AA, Putcha N, Drummond MB, Boriek AM, Hanania NA, Kim V, Kinney GL, McDonald ML, Brigham EP, Wise RA, McCormack MC. Obesity is associated with increased morbidity in moderate to severe COPD. *Chest*. 2017 Jan 1;151(1):68-77.