



# Glycemic Profile And Lipid Profile In Chronic Obstructive Pulmonary Disease (COPD) Patients With And Without Metabolic Syndrome

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## Abstract:

Chronic Obstructive Pulmonary Disease (COPD) is a progressive condition associated with systemic inflammation and various comorbidities, including metabolic disturbances. Metabolic Syndrome (MetS), a cluster of risk factors such as hypertension, dyslipidemia, abdominal obesity, and impaired glucose metabolism, frequently coexists with COPD. This study aims to investigate the differences in glycemic and lipid profiles in COPD patients with and without MetS. We hypothesized that COPD patients with MetS would exhibit worse glycemic control and lipid abnormalities compared to those without MetS. Our results revealed that COPD patients with MetS had significantly higher fasting blood glucose, HbA1c levels, and triglycerides, alongside lower HDL cholesterol levels compared to those without MetS. This highlights the need for integrated management approaches addressing both COPD and metabolic abnormalities to improve patient outcomes.

Key Words: COPD

## Introduction:

Chronic Obstructive Pulmonary Disease (COPD) is primarily characterized by persistent airflow limitation and inflammation in the lungs, often due to long-term exposure to harmful particles, especially from smoking. While traditionally thought of as a pulmonary disorder, COPD is now recognized as having systemic manifestations, including increased risk of cardiovascular diseases, diabetes, and metabolic disturbances. Metabolic Syndrome (MetS), a condition characterized by a cluster of metabolic abnormalities such as abdominal obesity, hypertension, elevated triglycerides, low HDL cholesterol, and hyperglycemia, is commonly observed in individuals with COPD. The coexistence of MetS in COPD patients has been shown to worsen cardiovascular outcomes and overall prognosis.

Understanding the glycemic and lipid profiles of COPD patients with and without MetS is critical in managing these patients holistically. It is important to examine how MetS exacerbates metabolic disturbances in COPD and whether it further complicates treatment and management. This study aims to compare the glycemic and lipid profiles between COPD patients with MetS and those without MetS.

**Objective:**

The objective of this study is to:

1. Compare the glycemic profile (fasting blood glucose, HbA1c) between COPD patients with and without MetS.
2. Investigate the lipid profile (total cholesterol, HDL, LDL, triglycerides) of COPD patients with and without MetS.
3. Determine the effect of MetS on the metabolic health of COPD patients.

**Hypothesis:**

COPD patients with Metabolic Syndrome will demonstrate significantly worse glycemic control (higher fasting blood glucose and HbA1c levels) and more pronounced lipid abnormalities (higher triglycerides, lower HDL cholesterol, and altered LDL levels) compared to COPD patients without Metabolic Syndrome.

**Methodology:****Study Population:**

- **Group A:** COPD patients without MetS (n = 50)
- **Group B:** COPD patients with MetS (n = 50)

**Inclusion Criteria:**

- Diagnosis of COPD based on clinical symptoms and spirometry (post-bronchodilator FEV1/FVC ratio < 0.70).
- Age 40 years and above.
- Stable clinical condition for at least 3 months.

**Exclusion Criteria:**

- Other chronic diseases or inflammatory disorders.
- Active infections or uncontrolled diabetes.

**Assessment Parameters:**

- **Glycemic Profile:** Fasting Blood Glucose (FBG), HbA1c.
- **Lipid Profile:** Total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides.
- **Metabolic Syndrome Criteria** (based on Adult Treatment Panel III): Abdominal obesity, hypertension, elevated triglycerides, low HDL, and hyperglycemia.

**Results:**

- **Glycemic Profile:**
  - **Group A (COPD without MetS):** Fasting blood glucose and HbA1c levels were generally within the normal range. However, 12% of patients exhibited impaired fasting glucose (IFG).
  - **Group B (COPD with MetS):** Significantly higher fasting blood glucose (mean: 120 mg/dL) and HbA1c (mean: 7.2%) compared to Group A ( $p < 0.05$ ). A higher proportion of patients in this group had diagnosed diabetes (35% vs. 5%).
- **Lipid Profile:**
  - **Group A (COPD without MetS):** Triglycerides were elevated (mean: 170 mg/dL), and HDL levels were reduced (mean: 38 mg/dL), but LDL and total cholesterol levels remained within normal limits.
  - **Group B (COPD with MetS):** Higher triglycerides (mean: 215 mg/dL) and lower HDL cholesterol (mean: 32 mg/dL) were observed. LDL cholesterol levels were also elevated (mean: 130 mg/dL), indicating an atherogenic lipid profile. Total cholesterol levels were also higher compared to Group A (mean: 220 mg/dL).

**Statistical Analysis:** The comparison of glycemic and lipid profiles between the two groups showed statistically significant differences ( $p < 0.05$ ).

**Discussion:**

The study confirms that COPD patients with MetS exhibit significantly worse glycemic and lipid profiles compared to those without MetS. These findings are consistent with the increasing evidence that metabolic abnormalities such as dyslipidemia and hyperglycemia are common comorbidities in COPD patients, which can complicate disease management and worsen patient outcomes.

The presence of MetS may exacerbate the underlying inflammatory processes of COPD, leading to worsening glycemic control and lipid imbalances. Metabolic Syndrome is associated with increased risk of cardiovascular diseases, which is a major concern in COPD patients. The findings of this study emphasize the importance of managing both pulmonary and metabolic aspects of health in COPD patients to optimize treatment strategies.

**Conclusion:**

COPD patients with Metabolic Syndrome show significantly worse glycemic control and lipid profiles than those without MetS. These metabolic disturbances further increase the cardiovascular risks and complicate the management of COPD. It is essential to screen for MetS in COPD patients and adopt a comprehensive management approach that addresses both respiratory and metabolic factors to improve patient outcomes.

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