

# INPLASY PROTOCOL

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None declared.

## The Overlap Syndrome of Obstructive Sleep Apnea and Chronic Obstructive Pulmonary Disease: A Systematic Review

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**Review question / Objective:** To provide the essential findings in the field of overlap syndrome of chronic obstructive pulmonary disease and obstructive sleep apnea, including prevalence, possible predictors, association with clinical outcomes, and severity compared to both chronic obstructive pulmonary disease and obstructive sleep apnea patients.

**Condition being studied:** OSA is characterized by complete cessation (apnea) or significant decrease (hypopnea) in airflow during sleep and recurrent episodes of upper airway collapse cause it during sleep leading to nocturnal oxyhemoglobin desaturations and arousals from rest. The recurrent arousals which occur in OSA lead to neurocognitive consequences, daytime sleepiness, and reduced quality of life. Because of apneas and hypopneas, patients are experiencing hypoxemia and hypercapnia, which result in increasing levels of catecholamine, oxidative stress, and low-grade inflammation that lead to the appearance of cardio-metabolic consequences of OSA. COPD is a chronic inflammatory lung disease defined by persistent, usually pro-gressive AFL (airflow limitation). Changes in lung mechanics lead to the main clinical manifestations of dyspnea, cough, and chronic expectoration. Furthermore, patients with COPD often suffer from anxiety and depression also, the risk of OSA and insomnia is higher than those hospitalized for other reasons. Although COPD is twice as rare as asthma but is the cause of death eight times more often.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 November 2022 and was last updated on 16 November 2022 (registration number INPLASY2022110077).

### INTRODUCTION

**Review question / Objective:** To provide the essential findings in the field of overlap syndrome of chronic obstructive pulmonary

disease and obstructive sleep apnea, including prevalence, possible predictors, association with clinical outcomes, and severity compared to both chronic

obstructive pulmonary disease and obstructive sleep apnea patients.

**Rationale:** Chronic obstructive pulmonary disease (COPD) and obstructive sleep apnea (OSA) are common disorders with substantial impacts on global health, causing a significant economic burden, which often co-occur with each other. The association of COPD and OSA is known as the COPD-OSA “overlap” syndrome (OS) and is linked with a poor prognosis. Although COPD and OSA are both highly prevalent diseases, it is unclear if each disorder predisposes to a higher incidence of the other, however, they can influence each other in pathophysiology. Both conditions are characterized by severe clinical symptoms and are associated with significant morbidity and mortality, especially when they co-occur together. Combined, these conditions cause a significant drop in oxygen during sleep, leading to an increased risk of disability and death. Usually, primary care physicians, pulmonologists, or sleep specialists make one diagnosis to have either OSA or COPD. COPD diagnosis is simple and inexpensive, whereas OSA diagnosis requires overnight polysomnography (PSG), a time-consuming and expensive test of limited availability. This systematic review aim to define the significance of these comorbidities according to the current state of knowledge.

**Condition being studied:** OSA is characterized by complete cessation (apnea) or significant decrease (hypopnea) in airflow during sleep and recurrent episodes of upper airway collapse cause it during sleep leading to nocturnal oxyhemoglobin desaturations and arousals from rest. The recurrent arousals which occur in OSA lead to neurocognitive consequences, daytime sleepiness, and reduced quality of life. Because of apneas and hypopneas, patients are experiencing hypoxemia and hypercapnia, which result in increasing levels of catecholamine, oxidative stress, and low-grade inflammation that lead to the appearance of cardio-metabolic consequences of OSA.

COPD is a chronic inflammatory lung disease defined by persistent, usually progressive AFL (airflow limitation). Changes in lung mechanics lead to the main clinical manifestations of dyspnea, cough, and chronic expectoration. Furthermore, patients with COPD often suffer from anxiety and depression also, the risk of OSA and insomnia is higher than those hospitalized for other reasons. Although COPD is twice as rare as asthma but is the cause of death eight times more often.

## METHODS

**Participant or population:** Patients with diagnosis of COPD by GOLD guidelines and diagnosis of OSA based on polysomnography.

**Intervention:** Not reported.

**Comparator:** Not reported.

**Study designs to be included:** Original articles.

**Eligibility criteria:** Completed, published, original articles, observational studies, full-text available in English, human studies, studies concerning the OS, diagnosis of COPD by GOLD guidelines, diagnosis of OSA based on polysomnography, good quality studies, studies published since 2018, at least 50 participants.

**Information sources:** A systematic literature review carried out with the use of three databases: Pubmed/MEDLINE, Scopus, and Cochrane.

**Main outcome(s):** Prevalence of Overlap Syndrome. Meaning of Age and Gender in Overlap Syndrome. Relevance of Body-Mass Index and Neck Circumference in Overlap Syndrome. Meaning of Smoking and Alcohol Consumption in Overlap Syndrome. Sleep Quality and Other Aspects of Quality of Life in Overlap Syndrome. Polysomnography Findings in Overlap Syndrome. Pulmonary Function in Overlap Syndrome. Factors of Chronic Obstructive Pulmonary Disease Exacerbations in Overlap Syndrome. Blood

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Test Results in Overlap Syndrome. The Role of Comorbidities in Overlap Syndrome. Risk of Mortality in Overlap Syndrome. Treatment in Overlap Syndrome. Predicting of Coexisting Obstructive Sleep Apnea in Patients with Chronic Obstructive Pulmonary Disease. Tools for Identifying Overlap Syndrome Patients.

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**Quality assessment / Risk of bias analysis:**

The risk of bias was assessed using the Newcastle-Ottawa quality assessment scale for cohort and case-control studies and its modified version adapted for cross-sectional studies.

**Strategy of data synthesis:** A customized data extraction sheet subsequently used for the collection of the following information: first author's name, year and country of publication, study design, the aim, study population, and the main results.

**Subgroup analysis:** OS-patients, COPD-only patients, OSA-only patients.

**Sensitivity analysis:** Conducted by 2 authors; the Newcastle-Ottawa quality assessment scale for cohort and case-control studies and its modified version adapted for cross-sectional studies.

**Language restriction:** English.

**Country(ies) involved:** Poland.

**Keywords:** Obstructive sleep apnoea (OSA); Chronic obstructive pulmonary disease (COPD); Overlap syndrome; Polysomnography; Spirometry.

**Contributions of each author:**

Author 1 - Katarzyna Czerwaty - Conceptualization, methodology, investigation, resources, data curation, writing - original draft preparation, visualization.

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