PREVALENCE AND SEVERITY OF OBSTRUCTIVE SLEEP APNEA IN PATIENTS WITH COPD UNDERGOING OUTPATIENT PULMONARY REHABILITATION: A LITERATURE REVIEW

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ABSTRACT

Introduction: Chronic obstructive pulmonary disease (COPD) and obstructive sleep apnea (OSA) are significant respiratory conditions with a global impact on public health. COPD leads to chronic inflammation and breathing difficulties, while OSA, characterized by episodes of apnea and hypopnea, affects sleep quality. **Objective:** To review the literature to understand the severity and prevalence of OSA in patients with COPD undergoing pulmonary rehabilitation (PR). **Methodology:** Three clinical trials were extracted from the PubMed database, published between 2015 and 2024. The Health Sciences Descriptors (DeCS) used for the search were: “chronic obstructive pulmonary disease,” “obstructive sleep apnea,” “rehabilitation,” “prevalence,” and “severity,” in English and Portuguese, with the Boolean operator “AND.” The inclusion criteria were publications in Portuguese and English, original studies, and free access. **Results:** OSA is prevalent among patients with COPD, with variations in the severity of respiratory disorders, and PR has been shown to demonstrate benefits in quality of life and control of the overlap syndrome. However, factors such as body mass index and comorbidities also influence the severity of COPD. **Conclusion:** The association between COPD and OSA is common and negatively affects patients' quality of life, and PR offers significant improvements; however, further studies are needed to strengthen the evidence and seek scientific consensus.

Keywords: Chronic Obstructive Pulmonary Disease; Obstructive Sleep Apnea; Pulmonary Rehabilitation.

INTRODUCTION

According to the World Health Organization (WHO), chronic obstructive pulmonary disease (COPD) is considered a public health problem and is the third leading cause of death worldwide. The condition is characterized by chronic inflammation and narrowing of the airways [1], resulting in muscle dysfunction, fatigue with minimal exertion, shortness of breath, sputum production, and coughing, as well as functional limitations that compromise quality of life (QOL) [2,3].

Obstructive sleep apnea (OSA) affects about one billion people worldwide, approximately 15% of the world's population, and is a highly prevalent respiratory disorder [4] that affects sleep quality due to periodic episodes of apnea and/or hypopnea [5].

The severity of OSA is quantified using the apnea-hypopnea index (AHI) in the time interval of each hour and can be classified as: mild OSA, AHI between 5 and 14.9 episodes per hour; moderate, AHI between 15 and 29.9 episodes per hour; and severe, when the AHI is equal to or greater than 30 episodes per hour [6]. In patients with COPD, the presence of isolated nocturnal hypoxemia (saturation below 90%) and OSA is directly related to its severity and, consequently, to the drop in nocturnal saturation [7,8].

The concomitant presence of OSA and COPD is defined as overlap syndrome (OS) [9], such that the association of both diseases in the respiratory tract results in a reduction in health-related quality of life (HRQoL), acute exacerbation of COPD, and poorer sleep quality when compared to individuals with OSA alone, in addition to being associated with higher cardiovascular morbidity [10]. Therefore, this study aims to conduct a bibliographic survey of recent studies in order to understand the severity and prevalence of OSA in patients with COPD undergoing PRP.

METHODOLOGY

This study is characterized as a literature review. The search for articles in the MEDLINE database (accessed through PubMed) began in July 2024 and ended in August 2024, in addition to a manual search of the references of included studies. The search criteria established were studies published between 2015 and 2024, using the *medical subject headings* (MeSH) vocabulary: “chronic obstructive pulmonary disease,” “obstructive sleep apnea,” “rehabilitation,” “prevalence,” and “severity,” with the Boolean operator “AND.” The inclusion criteria were clinical trials, published in English, freely accessible, addressing the prevalence and severity of OSA in individuals with COPD who underwent pulmonary rehabilitation (PR); and as exclusion criteria, non-original, incomplete studies with missing data were disregarded.

RESULTS

Three clinical trials were selected that addressed the prevalence and severity of OSA in patients with COPD, whether or not they underwent PRP.

The study by Turcani et al. (2014) evaluated the prevalence of OSA in 35 (51.4%) of 101 patients hospitalized for COPD exacerbation over a 4-month period, after stabilization of the patient's clinical condition and discontinuation of oxygen therapy, using polygraphy. The findings showed that 17 individuals had AHI below 5/h (mild) with nighttime saturation of 80% to 95%, and 18 individuals had AHI above 5 events/hour (h) with nighttime saturation of 60% to 94%, of which 9 individuals had moderate AHI and the remaining 9 individuals had severe AHI [11].

Schreiber et al. (2018) investigated the prevalence and predictors of OSA in 422 patients with COPD undergoing hospital-based PRP between 2007 and 2013 who were clinically stable regardless of disease severity. After evaluation, it was possible to identify that patients with OSA were overweight or obese; had lower mean nighttime oxygen saturation; and more severe daytime sleepiness, based on the Epworth Sleepiness Scale (ESS). The results of polysomnography showed that 232 patients (55%) had an AHI below 15 events/hour (mild) and 190 individuals (45%) had severe AHI and therefore underwent treatment for OSA. At the end of the PRP, 68% of patients were discharged with continuous positive airway pressure (CPAP), 15% with bilevel ventilation, and 17% without any ventilatory treatment [12].

The study by Silva et al. (2017) aimed to evaluate 64 patients with COPD and mild hypoxemia who were clinically stable, regarding the prevalence of OSA and predictive variables of nocturnal hypoxemia. After evaluation and analysis of the data of individuals admitted between April and September 2013, it was possible to identify that 39 patients (61%) had sleep-disordered breathing, 14 of whom (21.8%) had OSA. In addition, it was possible to identify that 25 patients (39.1%) had isolated nocturnal hypoxemia, and another 25 individuals (39.1%) did not have either sleep disorder [13].

CONCLUSION

The studies show that overlap syndrome, OSA associated with COPD, is common, demonstrating a correlation between both diseases in HRQoL. It was

possible to observe that there is a higher prevalence of OSA in hospitalized patients with COPD when compared to individuals who do not have the disease and that PRP promotes benefits in the control of the overlap syndrome, providing better SRQ, improving dyspnea, physical capacity, respiratory muscle function, exercise resistance, and reducing AHI.

However, predictive variables such as body mass index, comorbidities, and ESS also correlate with COPD exacerbation and severity. Thus, despite the positive results, it is important to highlight that further studies on the subject should be conducted, as this is a relatively new discussion in science, and there are still disagreements on certain aspects, in addition to a limited amount of scientific evidence on the subject.

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