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The Association Between Chronic Obstructive Pulmonary Disease and Depression and Other Mental Disorders: A Literature Review

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ABSTRACT

Chronic obstructive pulmonary disease (COPD) already represents a growing global health challenge, whose implications and consequences extend beyond the respiratory system, encompassing various mental disorders, including depression, anxiety disorders, cognitive impairment, and sleep disturbances. This literature review, covering publications from recent years, analyzes the multifactorial mechanisms linking COPD with mental health disorders—beginning with chronic inflammation, hypoxia, oxidative stress, and increasing functional limitations. The presented data indicate that depression affects even more than one-third of COPD patients, intensifying somatic symptoms of the underlying disease, increasing the risk of exacerbations, hospitalizations, and mortality, and reducing treatment adherence and the effectiveness of rehabilitation. Similarly, anxiety disorders, cognitive impairment, and sleep disturbances, which often coexist with COPD, influence the perception of dyspnea, the ability to self-manage therapy, and overall patient functioning. This paper highlights the importance of early diagnosis of mental disorders using validated screening tools, as well as the need for a holistic model of care combining pharmacological interventions with non-pharmacological approaches based on pulmonary rehabilitation, cognitive-behavioral therapy, and psychosocial support. Integration of pulmonological and psychiatric perspectives is essential both for improving patients' quality of life and optimizing prognosis. The findings point to an urgent need for further research on the mechanisms underlying comorbidities and the effectiveness of integrated treatment models.

Keywords: Chronic Obstructive Pulmonary Disease (COPD), Depression, Anxiety Disorders, Cognitive Impairment, Sleep Disorders, Mental Health

1. Introduction

Chronic obstructive pulmonary disease (COPD) is one of the greatest challenges of modern medicine. It affects approximately 12.6% of the global population, making it the fourth leading cause of death worldwide. It contributes to significant functional limitations in many individuals. The prevalence of COPD varies across continents—22.93% in North America, 19.48% in Southeast Asia, and 13.09% in Europe. [1]

The pathophysiology of the disease is complex and well understood. It consists of oxidative stress, chronic inflammation, protease-mediated lung tissue destruction, pathological remodeling of small airways, inflammatory cell recruitment, and impaired tissue repair. [2]

Symptoms of COPD primarily involve the respiratory system, the most common being dyspnea, cough, sputum production, wheezing, and a feeling of chest tightness or pain [3]; however, systemic symptoms may also occur, such as muscle weakness, weight loss leading to cachexia, and depression. [4] Symptoms vary widely across populations, and in most patients their type and severity are highly individual. [5]

Risk factors for COPD include active smoking (the strongest and best-known factor), passive smoking, biomass exposure, a history of tuberculosis, and rheumatoid arthritis. [6] Notably, COPD prevalence has changed in recent decades—the GBD (Global Burden of Disease) analysis covering the years 1990–2021 shows that the age-standardized prevalence has been decreasing by approximately −0.04% per year, while the absolute number of COPD cases worldwide has increased by 112% during this period. [7]

Given the high prevalence of COPD and the substantial number of related deaths worldwide, special attention should be paid to its coexistence with mental health disorders. These disturbances may result from both the biological consequences of the disease and psychosocial burden. Increasing evidence suggests that depression and anxiety are significantly more common in COPD patients than in the general population, and their presence worsens prognosis. [8]

2. Methodology of the Review

For this study, publications from 2000–2024 available in PubMed, Scopus, and Web of Science were analyzed. Included were clinical and observational studies, meta-analyses, and systematic reviews examining the relationship between COPD and depression or other mental disorders. Articles that were purely experimental (animal models) or lacking standard diagnostic tools were excluded.

3. Clinical Characteristics of Chronic Obstructive Pulmonary Disease

COPD is a progressive disease characterized by airflow limitation resulting from chronic airway inflammation and destruction of lung parenchyma. Symptoms such as dyspnea, cough, fatigue, and reduced physical activity adversely affect quality of life and daily functioning. Many patients also develop chronic hypoxia and elevated inflammatory markers, which may influence brain structures and emotional regulation. Additionally, COPD is frequently associated with loss of occupational and social functioning. [9]

COPD is currently recognized not only as a disease of the lungs but also as a systemic condition—chronic inflammation extends into the peripheral circulation, potentially leading to neuroinflammatory changes in the brain. [10] Chronic hypoxia, oxidative stress, and elevated levels of inflammatory cytokines (e.g., IL-6) contribute to damage in brain structures such as gray matter, which may result in cognitive impairment including memory, attention, and executive dysfunction. [11]

The link between chronic inflammation and mental disorders is also significant—elevated levels of pro-inflammatory cytokines have been associated with depressive symptoms in COPD patients regardless of airflow limitation severity. [12] Thus, the negative impact of COPD extends far beyond the respiratory system—chronic hypoxia, persistent inflammation, and neurodegenerative processes may contribute to cognitive and emotional disturbances, emphasizing the need for a holistic approach to patient care.

4. Depression in COPD and Their Correlation

The prevalence of depression among COPD patients is 34.5% [13], whereas in the general older population it is 28.4%. [14] The risk of depression increases with disease severity, number of exacerbations, and degree of dyspnea. A multicenter study demonstrated that depressive symptoms correlated with poorer lung function, greater dyspnea (higher mMRC score), more frequent exacerbations, and a higher BODE index. [15] Among patients requiring long-term oxygen therapy (NIV or LTOT), the prevalence of depression is even higher. [16]

The mechanisms underlying the comorbidity of COPD and depression are multifactorial. One of them is chronic inflammation—COPD is associated with elevated levels of pro-inflammatory cytokines (e.g., IL-6, IL-2, IFN-γ), which can modulate serotonergic and dopaminergic neurotransmission, increasing susceptibility to depression. [17] Psychosocial factors also play an important role: activity limitations, fear of dyspnea, social isolation, and dependence on others. [18]

Depression coexisting with COPD brings numerous negative clinical consequences, including significantly reduced quality of life, decreased motivation to manage the underlying disease, more frequent exacerbations and hospitalizations, and even increased mortality. [19] COPD patients with depression are less likely to begin or complete pulmonary rehabilitation programs—depression has been identified as a risk factor for non-completion of rehabilitation. [20]

5. Other Mental Disorders in COPD

5.1. Anxiety Disorders in COPD and Their Correlation

According to the meta-analysis *The prevalence of anxiety disorders among older patients with COPD*, the pooled prevalence of anxiety disorders in older adults with COPD is 36%. [21] Multiple mechanisms contribute to this comorbidity, including chronic inflammation and reactive oxygen species entering systemic circulation, elevating pro-inflammatory cytokines that reach the central nervous system and alter neuronal and neurotransmitter functions related to anxiety regulation. [22] Other contributing factors include hypoxia (which can cause neuronal injury and neurofunctional disturbances, increasing anxiety vulnerability) [23] and excessive activation of the hypothalamic-pituitary-adrenal axis due to chronic inflammation (elevated cortisol and other stress hormones modulate anxiety). [24]

Both dyspnea and anxiety or panic are subjective sensations, making it difficult to distinguish true physiological respiratory deterioration from psychogenic symptoms. [25] As noted by Willgoss and Yohannes (2013) and Pascal et al. (2017), [26] the occurrence of anxiety and panic attacks in COPD patients causes significant overlap between psychological and somatic symptoms, complicating assessment of whether dyspnea reflects an exacerbation or an anxiety episode. Nonetheless, many studies still rely solely on subjective assessments, and prospective analyses allowing reliable differentiation of these phenomena are lacking.

5.2. Cognitive Impairment in COPD and Their Correlation

There is growing evidence that COPD is associated not only with respiratory and somatic disturbances but also with cognitive impairment—from mild deficits to an increased risk of dementia. A meta-analysis found that individuals with COPD have a significantly higher risk of cognitive impairment or dementia compared to those without COPD (RR = 1.30; 95% CI 1.13–1.49). [27] Another analysis revealed that COPD patients experience faster cognitive decline at a significantly higher rate than individuals with normal lung function. [28]

In an observational study involving individuals aged 70–89 years, a COPD diagnosis was associated with nearly twice the likelihood of mild cognitive impairment (MCI) compared with

people without COPD. [29] The risk increased with disease duration, suggesting a cumulative effect of chronic ventilatory impairment and repeated hypoxic episodes on cognitive decline. [30]

Neuropsychological analyses indicate that deficits in COPD patients predominantly involve memory and attention, and in some studies also executive functioning, which may impair patients' ability to self-manage their disease, use inhalers correctly, adhere to treatment recommendations, and plan healthcare-related behaviors. [31]

Pathophysiologically, key mechanisms linking COPD to cognitive impairment include chronic hypoxia, episodic exacerbations, systemic inflammation, and comorbidities (e.g., cardiovascular disease), collectively leading to gradual brain damage and cognitive dysfunction. [31] Many authors therefore propose that cognitive assessment should be considered an integral part of holistic COPD care—particularly in older adults, patients with advanced disease, hypoxia, or multiple comorbidities. [31]

5.3. Sleep Disorders in COPD and Their Correlation

In COPD patients, sleep disorders are common yet often overlooked, despite their major clinical significance. A meta-analysis reported that the prevalence of obstructive sleep apnea (OSA), Restless Legs Syndrome (RLS), and insomnia in COPD patients is approximately 29.1%, 21.6%, and 29.5%, respectively. [32]

The pathophysiology of sleep disturbances in COPD is multifactorial. The disease leads to airflow limitation and abnormal respiratory mechanics. During sleep, decreased respiratory muscle tone, altered ventilatory drive, and the supine position contribute to hypoventilation and nocturnal desaturation. [33] Patients with COPD also exhibit more pronounced systemic inflammation, which adversely affects sleep. [34] Moreover, symptoms such as cough, dyspnea, and sputum production negatively influence sleep quality. [35] Interestingly, medications used in COPD management may indirectly impair sleep—insufficient suppression of airway inflammation by inhaled corticosteroids may contribute to nocturnal symptoms and awakenings. [36]

Consequences of sleep disturbances in COPD are clinically significant: impaired sleep quality, reduced sleep duration, and decreased efficiency lead to poorer quality of life, greater daytime symptoms such as fatigue and sleepiness, reduced psychosocial functioning, and notably—increased risk of COPD exacerbations and hospitalizations. [37]

6. Risk Factors for Mental Disorders in COPD Patients

In COPD patients, the risk of mental disorders—especially depression—is significantly higher than in the general population. According to the meta-analysis *Global prevalence and risk factors 2000–2022*, key risk factors include female sex, loneliness, severe dyspnea, advanced disease stage (GOLD III and IV), poor quality of life, and a higher BODE index. [13] Many studies also indicate smoking, low body weight, poor physical condition, the presence of other chronic diseases, and low socioeconomic status as factors increasing vulnerability to mood disorders. Social isolation and weak social support—often resulting from disease-related limitations—further promote the development of anxiety or depression. [38]

These risk factors, combined with chronic stress generated by daily COPD symptoms (particularly dyspnea), create a situation where somatic disease predisposes to mental disorders, which in turn worsen the course of COPD and reduce patients' quality of life.

7. Diagnosis of Mental Disorders in COPD Patients

Diagnosing mental disorders in COPD patients is a key component of comprehensive care, as mood and anxiety disorders often remain unrecognized or overlooked, and their symptoms may overlap with somatic symptoms of COPD. [39] Suspicion of a mental disorder begins with a detailed medical interview exploring issues such as low mood, anhedonia, anxiety, sleep disturbances, fatigue, and emotional irritability, while also assessing somatic symptoms of the underlying disease.

Validated screening tools commonly used in COPD patients include the Hospital Anxiety and Depression Scale (HADS), the Generalized Anxiety Disorder 7-Item Scale (GAD-7), and the Patient Health Questionnaire-9 (PHQ-9). [40] When screening results suggest the presence of a mental disorder (e.g., elevated HADS or PHQ-9 scores), this indicates the need for further psychological and psychiatric assessment, including evaluation of comorbidities and medications. Additionally, sleep quantity and quality should be assessed, as disturbances may mask depression or anxiety, or arise as a direct consequence of COPD. [41]

Routine assessment of mental disorders during follow-up visits and hospitalizations facilitates early diagnosis and timely intervention—pharmacological or psychotherapeutic—leading to long-term improvements in overall condition, quality of life, and adherence to COPD treatment.

8. Therapeutic Management and Models of Care

8.1. Pharmacological Treatment

In COPD patients with coexisting depression or anxiety disorders, pharmacotherapy should be considered early, especially when non-pharmacological interventions fail to produce sufficient benefit. In practice, the most commonly used medications are selective serotonin reuptake inhibitors (SSRIs) and serotonin-norepinephrine reuptake inhibitors (SNRIs), due to their good tolerability in this population. [18] Although evidence is still limited, some studies and reviews indicate that appropriately managed pharmacotherapy—especially when accompanied by psychiatric or psychological care—may reduce depressive symptoms and improve quality of life in COPD patients. [42]

However, some analyses suggest potential risks such as respiratory deterioration or increased susceptibility to infections and exacerbations with certain antidepressants, requiring careful risk-benefit assessment and individualized treatment. [43] In COPD patients with anxiety, benzodiazepines should generally be avoided due to the risk of respiratory depression and increased likelihood of respiratory failure. [44]

Pharmacotherapy should therefore be individualized, taking into account clinical condition, comorbidities, COPD severity, and potential drug interactions. Optimal care likely involves combining pharmacotherapy with pulmonary rehabilitation and psychosocial support—an approach reflecting truly holistic care. [45]

8.2. Non-pharmacological Interventions

Non-pharmacological interventions have documented effectiveness and should not be overlooked in favor of pharmacotherapy alone. Meta-analyses and systematic reviews indicate that pulmonary rehabilitation programs—including breathing exercises, disease education, and psychosocial support—reduce anxiety and depressive symptoms more effectively than standard care. [46] Cognitive-behavioral therapy (CBT) and training aimed at coping with fear of dyspnea also play an important role. [47]

Thus, incorporating these non-pharmacological strategies into holistic COPD care appears justified, as they improve quality of life and enhance adherence to treatment.

9. Future Research Directions

Despite numerous studies showing high comorbidity of COPD with depression, anxiety, and cognitive impairment, many aspects of the underlying mechanisms remain unclear. There is still a strong need for prospective, multicenter studies to precisely differentiate and characterize

the impact of chronic inflammation, hypoxia, and psychosocial factors on the development of mental disorders in COPD patients. [12, 17, 22]

Another important research direction involves studying holistic interventions combining pharmacotherapy, pulmonary rehabilitation, and psychological support, tailored to individual needs across different stages of disease severity. [46, 47] The literature also emphasizes the need to develop and validate specific, high-quality diagnostic tools and biochemical markers enabling early identification of patients at high risk of mental disorders, which would improve care planning and treatment effectiveness. [40, 41]

Equally important is investigating the long-term effects of treating depression and anxiety on COPD course, frequency of exacerbations, and cognitive functioning. [18, 45]

10. Conclusions

Analysis of the current literature demonstrates that COPD is not only a major somatic health problem but also a significant challenge in the domain of mental health. The coexistence of COPD with mental disorders—including depression, anxiety, cognitive impairment, and sleep disturbances—is more frequent than in the general population and significantly worsens disease course and quality of life.

The mechanisms linking COPD to mental disorders are multifactorial. Depression increases the risk of exacerbations, hospitalizations, and mortality, and also hinders participation in pulmonary rehabilitation and treatment adherence, thereby deepening functional limitations and worsening prognosis. Anxiety disorders and panic attacks intensify the subjective perception of dyspnea, complicating clinical assessment and increasing psychological burden. Cognitive impairment limits disease self-management, medication adherence, and planning, while sleep disturbances exacerbate fatigue, reduce quality of life, and increase the risk of COPD exacerbations.

Mental health diagnostics should therefore become an integral part of COPD care. Screening tools such as HADS, PHQ-9, and GAD-7, combined with detailed psychiatric and psychological evaluation, allow early detection and timely intervention. Effective treatment requires a holistic approach, combining pharmacotherapy (with careful selection of medications) and non-pharmacological interventions such as pulmonary rehabilitation, CBT, and psychosocial support.

In summary, the relationship between COPD and mental disorders is complex and multidimensional. Incorporating mental health considerations into COPD management improves quality of life and may positively influence disease course and prognosis. This review

highlights the need for systematic, comprehensive evaluation of COPD patients and outlines future research and clinical directions in which integrated pulmonological and psychiatric care should become standard practice.

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Conflict of Interest

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