



## THE IMPACT OF DEPRESSIVE DISORDERS ON THE DAILY LIFE AND HEALTH OF PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Chronic obstructive pulmonary disease, COPD, depression, depressive disorders, CAT test, CES-D, FEV1.

### ABSTRACT

*This article describes a study analyzing the impact of COPD on the daily life and health of patients. The frequency of occurrence of depressive disorders among these patients and their impact on the course of the disease and the life of patients with COPD are analyzed. The study included 100 patients. The results emphasize the need to include assessment of depressive disorders in a comprehensive approach to the diagnosis of COPD for their further correction and improvement of the general condition of patients.*

## ВЛИЯНИЕ ДЕПРЕССИВНЫХ РАССТРОЙСТВ НА ПОВСЕДНЕВНУЮ ЖИЗНЬ И ЗДОРОВЬЕ БОЛЬНЫХ ХРОНИЧЕСКОЙ ОБСТРУКТИВНОЙ БОЛЕЗНЬЮ ЛЕГКИХ

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### ABSTRACT

*В данной статье представлено исследование, посвященное анализу влияния ХОБЛ на повседневную жизнь и здоровье пациентов. Проанализированы частота встречаемости депрессивных расстройств среди этих пациентов и их влияние на течение заболевания и жизнь пациентов с ХОБЛ. В исследование было включено 100 пациентов. Результаты подчеркивают необходимость включения оценки депрессивных расстройств в комплексный подход к диагностике ХОБЛ для их дальнейшей коррекции и улучшения общего состояния пациентов.*

**Introduction.** Today, chronic obstructive pulmonary disease (COPD) is considered a significant health problem. This disease is one of the most common chronic diseases of the respiratory system among the adult population. Despite advances in diagnosis and



treatment, COPD continues to be associated with serious complications that increase the risk of death. According to the World Health Organization (WHO), COPD is the third leading cause of death in the world. COPD is characterized by a multifaceted impact on the patient's life, not only on physical activity, but also on the mental side of the patient's life. This has a significant impact on the quality of life of patients. To quantitatively assess the patient's well-being, integral tests (questionnaires) are becoming increasingly important, allowing, with minimal time spent working with them, to comprehensively reflect the course of the disease and the dynamics of the condition. An example of such a questionnaire was the CAT test (COPD Assessment Test) [3, 8]. Using this questionnaire, it is possible to assess the impact of COPD on the daily life and health of patients.

COPD has many comorbidities that worsen the course of the disease [1]. The impact of COPD on quality of life is closely related to the occurrence of anxiety and depression. Therefore, anxiety and depressive disorders are quite common as a comorbid pathology in patients with COPD [7, 12].

Anxiety and depressive disorders, detected with a frequency of 10% to 90% [11, 10, 6], have a significant impact on the progression of the disease and worsening symptoms, increasing the frequency of exacerbations [4].

The relationship between depression and COPD is bidirectional, i.e. depression can contribute to COPD, and COPD can contribute to depression. Frequent exacerbations, the severity of COPD, and frequent hospitalizations cause a more depressive state. Depressive disorders in patients with COPD manifest themselves as a "reaction" to losses caused by the disease. They consist of decreased mobility, inability to perform previous professional activities, and changes in lifestyle. Persistent low mood, pessimism, and focus on painful health lead to the formation of a gentle protective regime and minimization of stress. In this regard, there is a fear of becoming a burden for loved ones due to the progression of the disease. As a result of restrictions on physical activity, a reduction in social circles is also observed, and the communication capabilities of patients are reduced. As a result of lack of communication, depending on their temperament, some people may begin to withdraw into themselves, which can lead to the development of depressive disorders. Depression, in turn, entails feelings of helplessness, isolation, hopelessness and fear. This leads to a loss of self-confidence and disinterest in self-care and health [9, 10], which can interfere with treatment and pulmonary rehabilitation of COPD [5], creating a pathological cycle of deterioration in health [5]. According to research by DiMatteo M.R. et al., COPD patients with depression were 3 times more likely to be non-adherent to prescribed medications, exercise, diet, and health-related behaviors. In addition, there is a decrease in the likelihood of quitting smoking, which further aggravates the course of the underlying disease and can lead to death.

The importance of early detection and correction of these disorders is emphasized by their negative impact on the respiratory functions of patients with COPD [2]. According to A. M. Yohannes et al. [12], in patients with COPD there is an association between depression and pulmonary function, in particular between symptoms of depression and pulmonary obstruction [12].



This work is aimed at studying the impact of COPD and depressive disorders on the daily life and health of patients, identifying the frequency of occurrence of depressive disorders in patients with COPD and their impact on the course of the disease. This may contribute to the development of new approaches to the treatment and prevention of depression in this category of patients, which will help improve the quality of life of patients with COPD and the outcomes of this disease.

**Aim:** to assess the incidence of depressive disorders in patients with chronic obstructive pulmonary disease and analyze their impact on the daily life and health of patients.

**Material and methods of research:** The study included 100 patients with a documented diagnosis of COPD (86% (86) men and 14% (14) women) who were hospitalized at the Republican Specialized Scientific and Practical Medical Center for Phthysiology and Pulmonology. To confirm the diagnosis and determine the severity of the disease, spirometry was performed using the SMP-21/01-R-D device (Monitor, Russia). The average age of the patients was  $66 \pm 8$  years. In total, the study included patients with severe stage III COPD - 15 people and patients with extremely severe stage IV COPD - 85 people.

To identify and assess the severity of depression, patients underwent psychological testing using the CES-D questionnaire. The scale includes 20 items, each of which measures the subjective frequency of depressive symptoms over the past month and is ranked from 0 (symptom present very rarely or never at all) to 3 (symptom present all the time). When interpreting the results, the total indicator was taken into account, and 4 areas of its values were identified: 0-17 points – normal; 18-26 points – mild depression; 27-30 points – moderate depression; 31 points and above – severe depression.

To assess the degree of impact of COPD on the well-being and daily life of patients, the COPD Assessment Test - CAT (COPD Assessment Test) was used. The questionnaire consists of 8 items to assess health impairment in COPD. Items are formed on a 6-point semantic differential scale from 0 to 5 points. When interpreting the results, the total indicator was taken into account, and 4 areas of its values were identified: 0 - 10 points - insignificant impact of COPD on the patient's life; 11 - 20 points - moderate impact of COPD on the patient's life; 21 - 30 points - strong impact of COPD on the patient's life; 31 - 40 points - extremely strong impact of COPD on the patient's life

Statistical analysis was carried out using the STATISTICA 13.3 program (developed by StatSoft.Inc). All values in the text are presented as the arithmetic mean of the variation series of the error of the mean ( $M \pm m$ ). Values with  $p < 0.05$  (with a confidence level of 95%) were used as a statistical hypothesis.

**Results and discussions.** A total of 100 patients with COPD were examined. Among them, an increase in the number of CAT scores was noted depending on the progression of the stage of COPD. Thus, in patients with COPD stage III CAT  $23 \pm 6$  points, in patients with COPD stage IV CAT =  $26 \pm 5$  points. When assessing the CAT score, which reflects the degree of influence of COPD on the daily life of patients, the following results were obtained (Table 1).

**Table 1**



**CAT test in patients with COPD by stages**

CAT, points	COPD Stage III (n = 15)	COPD Stage IV (n = 85)
<b>CAT 0-10 points</b>	1 (6.7%)	0 (0)
<b>CAT 11-20 points</b>	4 (26.7%)	12 (14.1%)
<b>CAT 21-30 points</b>	9 (60%)	59 (69.4%)
<b>CAT 31-40 points</b>	1 (6.7%)	14 (16.5%)

The table shows that minor and moderate impact of COPD on patients' daily lives was most often observed among patients with stage III COPD, while strong and extremely severe impact was most common among patients with COPD IV.

Because the CAT questionnaire includes symptoms such as cough, sputum, chest tightness, shortness of breath when climbing stairs, activity at home, and confidence when leaving home, it was of interest to study the correlation between CAT and FEV1. The study found a moderately strong inverse relationship between CAT and FEV1 ( $p < 0.05$ ).

All this confirms the research of other authors that more severe COPD has a stronger impact on the daily life and health of patients.

According to the available literature, depressive disorders are quite often found among patients with COPD. Depressive disorders can also have an adverse effect on the quality of life of patients. In this regard, it was of interest to study the incidence of depressive disorders in patients with COPD, their impact on the course of the disease and the adverse impact on the daily life and health of patients with COPD.

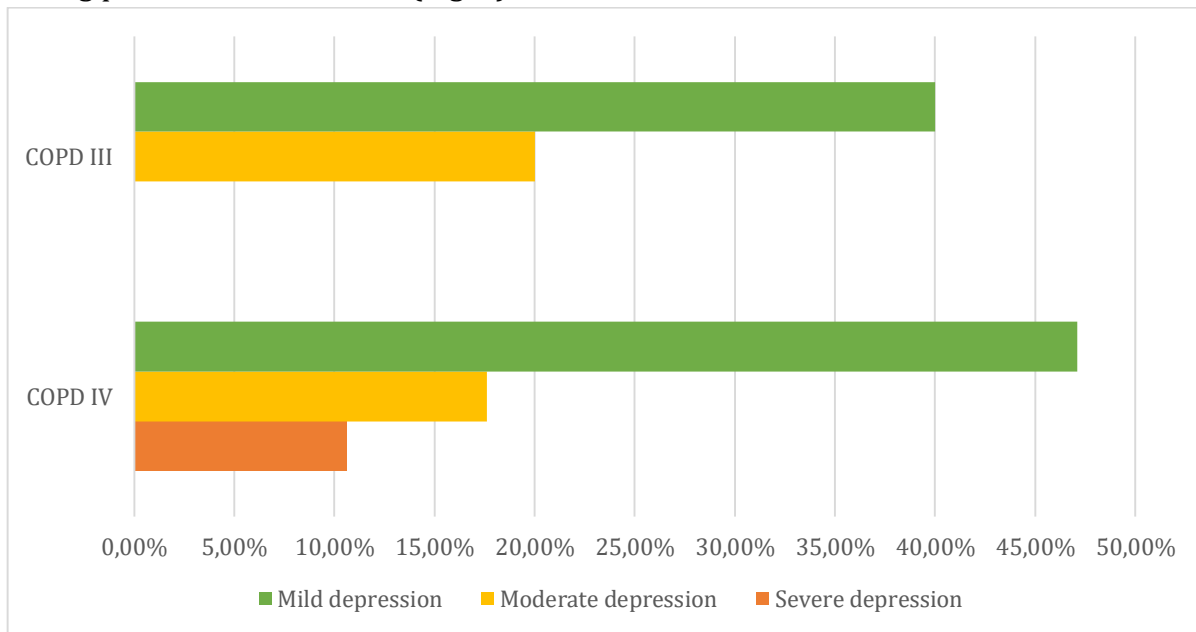
Depressive disorders were identified in 73% of those studied. At the same time, the frequency of depressive disorders in patients with COPD stage IV was 75.3% of cases, and among patients with COPD stage III – 60%. As the stage of COPD progressed, there was an increase in the number of scores on the CES-D depression questionnaire. Thus, in patients with stage III COPD, the average scores on the CES-D depression questionnaire were  $18.47 \pm 8.22$  points, and in patients with stage IV COPD -  $22.21 \pm 6.48$  points ( $p < 0.05$ ). When assessing the level of depressive disorders among patients with COPD III and COPD IV, the following results were obtained (Table 2)

**Table 2**

**Analysis of the "CES-D" indicator depending on the stage of COPD**

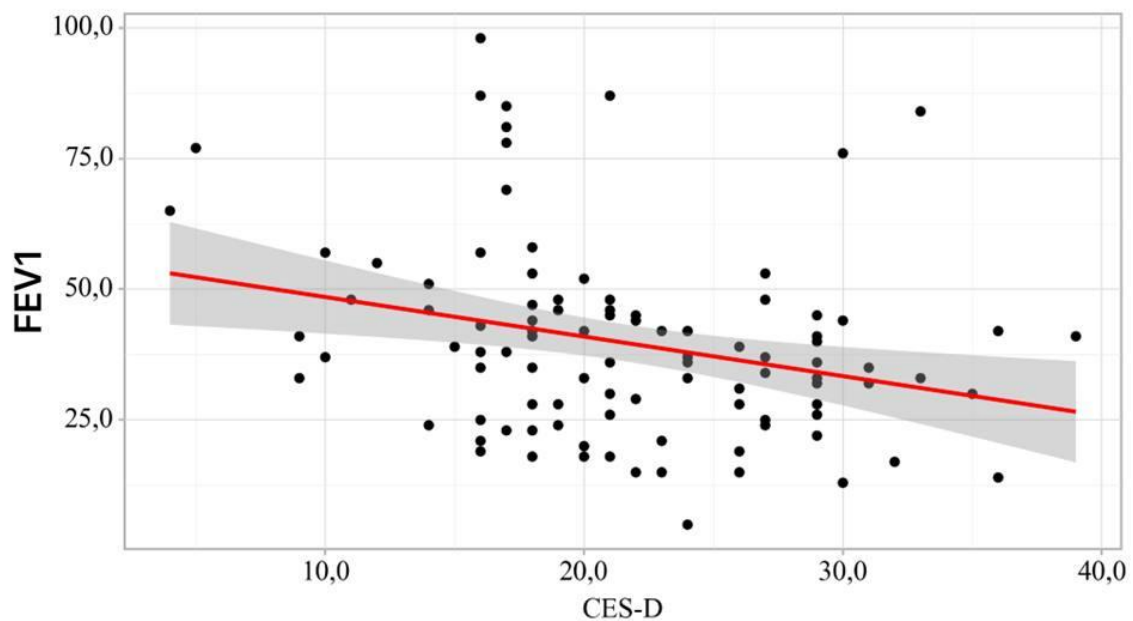
Indicator	Categories	COPD Stage	
		COPD III	COPD IV
CES-D	<b>Normal</b>	6 (40,0)	21 (24,7)
	<b>Mild depression</b>	6 (40,0)	40 (47,1)
	<b>Moderate depression</b>	3 (20,0)	15 (17,6)
	<b>Severe depression</b>	0 (0,0)	9 (10,6)

The table shows that mild depression (18-26 points) was observed in 40% of patients with COPD stage III, in 47.1% of patients with COPD IV. Moderate depression (27-30 points) was observed in 20% of patients with COPD stage III, in 17.6% of patients with COPD stage IV. Severe depression (31 points and above) was observed in 10.6% of patients with stage IV COPD and was not detected at all among patients with stage III COPD. The incidence of mild and moderate depression did not differ significantly between patients with COPD III and COPD IV ( $p > 0.05$ ), but severe depression was detected only among patients with COPD IV (Fig. 1).



**Fig. 1 Level of depressive disorders among patients with COPD III and COPD IV**

Since there is a possibility that depression may have an adverse effect on the course of COPD, it was of interest to study the correlation between the severity of depressive disorders and FEV parameters, primarily FEV1. The study revealed that the lowest FEV1 values were found among patients with depressive disorders. Thus, the average FEV1 level in patients with depression + COPD was 35%, and in patients with COPD without depression - 46% ( $p < 0.05$ ). When assessing the relationship between FEV1 and the severity of depressive disorders, a weak inverse relationship was established ( $p < 0.005$ ). With an increase in the “CES-D” indicator by 1, one should expect a decrease in the “FEV1” indicator by 0.756 (Fig. 2).



**Fig. 2 Regression function graph characterizing the dependence of the FEV1 indicator on the CES-D indicator**

Because CAT reflects the impact of COPD on patients' daily lives, the relationship between CAT scores and depression was examined. The entire study group was divided into 2 subgroups. The first subgroup - 27 patients with COPD without depression (0-17 points on the CES-D scale), the second subgroup - 73 patients with COPD + depression (18-60 points on the CES-D scale). In COPD patients without depression, the CAT level was  $21 \pm 5$  points; in the COPD + depression group, CAT was  $27 \pm 4$  points ( $p < 0.05$ ). A significant direct correlation between CAT and the level of depression was established ( $p < 0.001$ ).

The results of this study confirmed the high incidence of depression in patients with COPD. We found that among patients with COPD, depressive disorders occur in 73% of patients. This was noted by other authors [11, 10, 6]. We also found that as the stage of COPD progresses, more severe manifestations of depression are observed. Thus, only in COPD IV was the presence of severe depression observed. Other researchers also confirm the negative impact of depressive disorders on the severity of COPD symptoms [4]. Patients with COPD who are diagnosed with depression have been found to have more severe ventilation problems and more severe respiratory symptoms compared to patients without mental disorders [2]. Our study found that COPD patients suffering from depression had significantly lower FEV1 values compared to patients without depression. The average FEV1 in patients with COPD and depression was 35%, which is 11% lower than in patients with COPD without depression (46%) ( $p < 0.05$ ). This suggests that depression may influence the severity of COPD by exacerbating functional respiratory impairment.

**Conclusions.** A slight impact of COPD on the daily life and health of patients according to CAT results was noted in 6.7% of patients with stage III COPD.



2. A moderate impact of COPD on the daily life and health of patients was observed in 26.7% of patients with stage III COPD, 14.1% of patients with stage IV COPD.

3. COPD had a strong impact on the daily life and health of patients in 60% of patients with COPD stage III, 69.4% of patients with COPD stage IV.

4. An extremely strong impact of the disease on the daily life and health of patients was observed in 6.7% of patients with stage III COPD, 16.5% of patients with stage IV COPD.

5. A moderately strong inverse relationship was established between CAT and FEV1 ( $p < 0.05$ ).

6. Depression was detected in 73% of the study group with COPD. Severe COPD was associated with an increase in the frequency and severity of depressive disorders, this was especially noticeable at stage IV COPD, where severe depression was observed in 10.6% of patients, in contrast to stage III, where severe depression was not detected.

7. The study revealed that the lowest FEV1 values were found among patients with depressive disorders. The average FEV1 level in patients with depression + COPD was 35%, and in patients with COPD without depression – 46%.

8. An inverse correlation was found between the severity of depression and FEV1, which supports the hypothesis that depression has a negative effect on the course of COPD.

9. In COPD patients with depression, CAT was  $27 \pm 4$  points.

10. A significant direct relationship was established between CAT and the level of depression ( $p < 0.05$ ).

Thus, COPD has a significant impact on the daily life and health of patients, especially in the later stages of the disease. It is important to note that depressive disorders accompany COPD in a significant proportion of cases, have a significant impact on the daily life of patients and have a close relationship with the severity of the disease and its clinical course. Therefore, it is very important to improve the early detection of depression in patients with COPD. Although screening for these psychiatric comorbidities takes slightly more time during the patient assessment, it should nevertheless become standard practice to protect the quality of life of patients with COPD. For successful treatment and rehabilitation of patients with COPD, it is important to conduct questionnaires to identify and assess the severity of depression, followed by the involvement of psychotherapists in the cooperation to correct the identified disorders.

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