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Anxiety/depression scores and affecting factors in COPD patients

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Abstract:

BACKGROUND AND AIM: Mental disorders are common in chronic obstructive pulmonary disease (COPD) patients. In this study; anxiety/depression and affecting factors in COPD patients were examined.

METHODS: COPD patients who applied to Akdeniz University Chest Diseases clinic between November 2019 and March 2020 were included in the study. The diagnosis and staging were assessed according to the Global Initiative for Chronic Obstructive Lung Disease 2020 (GOLD-2020). The data were collected via face-to-face interviews using the patient description form. In addition, COPD assessment test (CAT), modified-medical research council (m-MRC), and hospital anxiety and depression (HAD) scale were applied to the patients. Anxiety/depression status was assessed using HAD scale. We evaluated the relationship between HAD scores and questionnaire and clinical findings. The data were analyzed in SPSS 22.0 program. χ^2 , ANOVA, Kruskal-Wallis, Student's t-test, and Mann-Whitney-U test were used. Correlation and linear regression analysis were used.

RESULTS: The majority of the 151 patients were male (84.8%), mean age was 66.1±9.5 years, and 27% were active smokers. Most of the patients had comorbidity (76.8%) and 4.6% of the patients reported that they had a psychiatric illness. The HAD-anxiety score was 4.70±4.03, and the HAD-depression score was 4.98±3.50. Depression and anxiety rates were 21.6% and 8.6%, respectively. The prevalence of anxiety and/or depression was found to be 23.7%. Multivariate analysis showed that the presence of comorbidity, severe COPD, and the number of complaints are the effective factors for both anxiety and depression. CAT and m-MRC scores were significantly correlated with HAD scores.

CONCLUSIONS: Anxiety/depression was found five times more than that reported. Severe COPD, more complaints, and comorbidity were risk factors for anxiety/depression.

Keywords:

Anxiety, COPD, depression, HAD score

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Introduction

Chronic obstructive pulmonary disease (COPD) causes significant morbidity and mortality and is one of the leading causes of increasing economic and social burden in the world. Anxiety and depression (anxiety/depression) are the most common mental disorders in COPD.^[1-4] COPD patients are accompanied by psychological disorders ranging from depressed and anxious moods to full-blown mental illness. Depressive symptoms and anxiety may be interpreted as side effects of COPD and may be ignored.^[4, 5]

In this study, anxiety/depression scores and related factors were investigated in COPD patients. The aim of the study is to draw attention to the frequency of anxiety/depression in the management of COPD patients.

Materials and Methods

After the capture of necessary permits (2012-KAEK-20), 151 COPD patients who applied to our clinic between November 2019 and March 2020 were included in the study. Pulmonary function tests and other tests, if necessary, were performed. Patients' age, gender, occupation, socioeconomic level (SEL), smoking status, disease duration, symptoms, hospitalization, comorbidities, physical activities, and treatments were recorded. Three questionnaires were used with a face-to-face interview with the participants. Two of these surveys are the COPD assessment test (CAT) and modified medical research council (m-MRC) survey used for symptom assessment in COPD. These two tests are recommended for the classification of COPD.^[6] The classification of COPD is based on GOLD-2020.^[6] In addition, the hospital anxiety and depression (HAD) scale was applied to determine the anxiety/depression status of the patients. The HAD scale was developed by Zigmond and Snaith to determine the risk and measure the level of anxiety and depression. Validity and reliability investigation of HAD in Turkey has been made by Aydemir and colleagues.^[7] Fourteen questions of this scale are for anxiety assessment and seven are for depression assessment. Regarding the cutoff points of HAD scale, if the anxiety score (HAD-A) ≥ 11 , it is accepted as anxiety, and if the depression score (HAD-D) ≥ 8 , it is accepted as depression.^[7] According to the score obtained from the HAD test, if necessary, the patients were advised to administer to the psychiatry clinic. HAD results were

compared with both the questionnaire and the patient's clinical and laboratory findings, and factors associated with anxiety/depression were investigated.

Statistical analysis

The data was analyzed in SPSS 22.0 program. When the data was compared, χ^2 for numerical data, ANOVA and t-tests for measurement data, were used. Also, correlation analysis and multiple regression analysis were applied.

Results

In this follow-up study, 151 COPD patients, 23 female and 128 male (84.8%), were included. The mean age of the patients was 66.1 ± 9.5 and they were COPD patients with a mean of 7 years. The majority of our study group (72.8%) consisted of retirees. The patients whose socioeconomic levels were defined as moderate was 58.9%. The rate of "good" group was 38.4%. While 26% of the patients were active smokers, 70% had quit smoking.

According to the HAD, the mean anxiety score (HAD-A) of patients was 4.70 ± 4.03 and the mean depression score (HAD-D) was 4.98 ± 3.50 . The frequency of depression among COPD patients was 21.6%, the frequency of anxiety was 8.6%, and the frequency of anxiety and/or depression was 23.7% [Fig. 1].

In our study, factors related to anxiety/depression were investigated. Pairwise comparisons are given in Table 1. Anxiety/depression scores were higher in female patients than in male patients (Table 1). The anxiety score was 4.19 in men and 7.45 in women ($p < 0.001$). Depression score was 4.70 in men and 6.45 in women ($p = 0.032$). The distribution of anxiety/depression by gender is summarized in Figure 1. Anxiety was 6% and depression was 18.8% in male patients. Anxiety was 22.7% and depression was 36.4% in women. The frequency of anxiety was significantly higher in women than in men ($p = 0.01$). A value of 40.9% of female patients and 20.5% of male patients had no anxiety and/or depression [Fig. 1].

In our study, a significant relationship was found between the anxiety/depression level and "the number of complaints." The frequency of anxiety/depression increased significantly, especially in patients with two or more complaints. In those with three or more com-

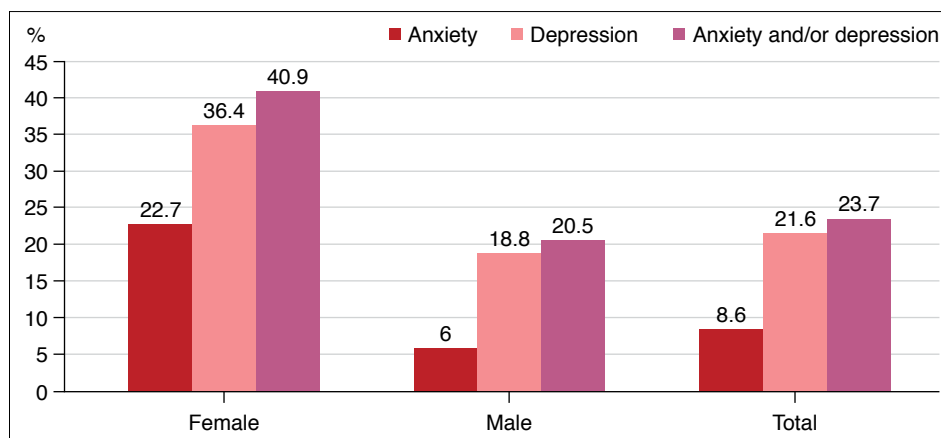


Figure 1: Anxiety and depression frequency according to gender

plaints, the frequency of anxiety was over 15%, while the frequency of depression was over 30% ($p < 0.05$) [Fig. 2].

Our patients were classified according to GOLD-2020. Patients with “severe COPD” (Group D) accounted for 37% of all patients. Anxiety/depression scores and frequencies of each group are given in Table 1. Both anxiety/depression scores and frequencies increased significantly as the disease severity increased (Table 1, Fig. 2). The frequency of anxiety increased to 17.9%, and the depression frequency increased to 30.4% in severe COPD patients ($p < 0.01$).

Another investigated factor was the presence of “comorbidity,” which was present in 76.8% of patients. Hypertension (39.7%) and cardiovascular system diseases (32.5%) were the top two ranks. In medical history, 4.6% of the patients declared that they had psychiatric illness while 8.6% of them declared to have sleep disorders. Anxiety/depression scores of COPD patients with comorbidity were significantly higher than those without. While the score was approximately 3 in those without comorbidity, it was found to be above 5 with comorbidity ($p < 0.05$) (Table 1). In the presence of comorbidity, the frequency of anxiety increased from 3.2% to 10.2%, and the frequency of depression increased from 9.7% to 25% [Fig. 2].

“Smoking” status was also investigated. While smoking was found to be related to the anxiety score, there was no relationship between smoking and depression score (Table 1). The anxiety score was 4.08 in those who quit and it reached 5.97 in active smokers ($p = 0.01$). Another finding was the relationship between “regular sports habit” and anxiety. The anxiety score (3.80) of COPD patients who did

Table 1: Anxiety/depression scores according to some features

| Variables | n | HAD-A score | HAD-D score |
|----------------------------|-----|-------------------|-----------------|
| Gender | | | |
| Female | 23 | 7.45±4.99 | 6.45±3.40 |
| Male | 128 | 4.19±3.62 | 4.70±3.47 |
| p | | <0.001* | 0.03** |
| Age | | | |
| ≤60 | 39 | 6.08±4.35 | 5.77±3.52 |
| 61–70 | 23 | 4.59±3.50 | 4.41±3.08 |
| >70 | 51 | 3.76±4.03 | 4.94±3.81 |
| p | | 0.02*** | 0.19*** |
| Comorbidity | | | |
| (-) | 27 | 3.16±2.73 | 3.72±2.61 |
| (+) | 124 | 5.04±4.19 | 5.26±3.62 |
| p | | 0.034* | 0.046** |
| Complaints number | | | |
| (-) | 18 | 3.44±2.89 | 3.83±2.43 |
| 1 | 24 | 3.29±2.82 | 3.96±2.91 |
| 2 | 38 | 4.29±4.11 | 5.24±3.97 |
| 3+ | 59 | 5.93±4.39 | 5.59±3.58 |
| p | | 0.013*** | 0.11*** |
| COPD classification (GOLD) | | | |
| A | 32 | 3.31±2.93 | 3.81±2.76 |
| B | 34 | 4.23±3.01 | 4.62±3.25 |
| C | 17 | 4.47±4.54 | 4.53±3.04 |
| D | 56 | 5.85±4.67 | 6.02±3.94 |
| p | | 0.029**** | 0.026*** |
| Cigarette smoking status | | | |
| Ex-smoker | 106 | 4.08±3.74 | 4.61±3.46 |
| Smoker | 40 | 5.97±4.26 | 5.89±3.61 |
| p | | 0.014** | 0.064** |
| Total | 151 | 4.70±4.03 | 4.98±3.50 |

Statistically significant results are written in bold. *Mann-Whitney U test, **Student’s t-test, ***ANOVA test, ****Kruskal-Wallis test, HAD: Hospital anxiety and depression, GOLD: The Global Initiative for Chronic Obstructive Lung Disease

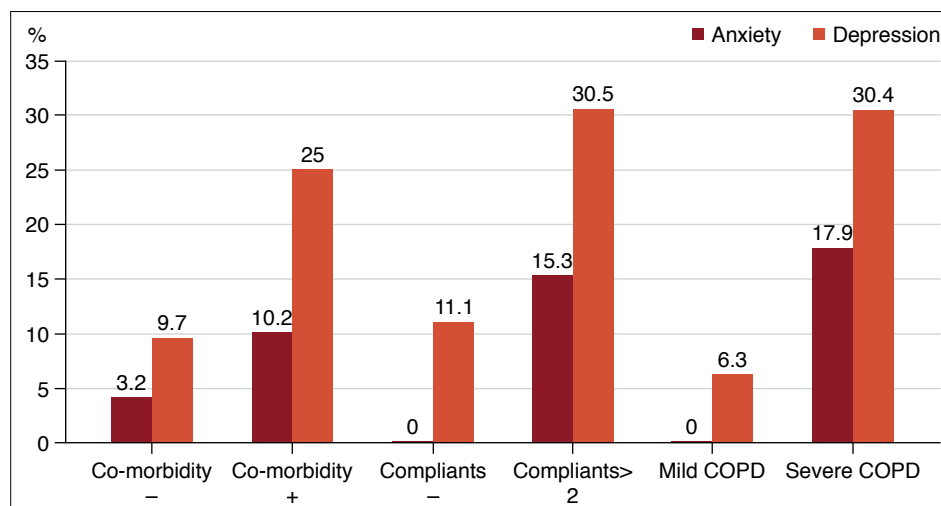


Figure 2: Frequencies of anxiety/depression according to some features in COPD patients
COPD: Chronic obstructive pulmonary disease

regular sports was lower than the patients who did not (5.62), ($p=0.008$). However, there was no significant relationship between regular sports and depression ($p=0.19$).

The anxiety / depression scores of patients with good SEL were slightly lower than the scores of patients with moderate–bad SEL. However, the difference was not statistically significant ($p>0.05$) (Table 1).

By analyzing all the factors associated with anxiety / depression together, multiple analysis was carried out to determine the effective factors among them. Before multiple analysis, correlations of variables that may be

associated with anxiety / depression were examined. The values are given in Table 2.

The effects of variables, which were found to be significantly correlated in pairwise comparisons, were investigated by linear regression analysis. Among these variables, “number of complaints,” “severity of COPD,” and “comorbidity” were found to have enhancing effects on both anxiety and depression scores. It was determined that “female gender” and “being relatively younger” had an increasing effect on anxiety (Table 3). It was determined that other factors (SEL, regular sport, etc.) had no effect.

Table 2: Correlations between anxiety/depression scores and some variables

| Independent variables | HAD-D score | | HAD-A score | |
|----------------------------------|-------------|--------------|-------------|--------------|
| | r | p | r | p |
| Age | -0.12 | 0.168 | -0.27 | 0.001 |
| Number of complaints | 0.19 | 0.024 | 0.28 | 0.001 |
| Cough | 0.21 | 0.012 | 0.23 | 0.007 |
| Dyspnea | 0.07 | 0.41 | 0.13 | 0.14 |
| Comorbidity | 0.17 | 0.038 | 0.23 | 0.005 |
| Regular sports habit | 0.11 | 0.19 | -0.23 | 0.008 |
| Severity (Class D) | 0.25 | 0.003 | 0.25 | 0.003 |
| Hospital admissions number | 0.15 | 0.07 | 0.14 | 0.11 |
| Number of emergency applications | 0.07 | 0.42 | 0.13 | 0.116 |
| Cigarette consumption | -0.11 | 0.20 | -0.12 | 0.17 |
| FVC | -0.20 | 0.020 | -0.07 | 0.376 |
| PEEF | -0.18 | 0.030 | -0.17 | 0.045 |
| m-MRC | 0.27 | 0.001 | 0.25 | 0.003 |
| CAT | 0.38 | 0.000 | 0.37 | 0.000 |

Statistically significant results are written in bold. HAD: Hospital anxiety and depression, FVC: Forced vital capacity, PEEF: Peak expiratory flow, m-MRC: Modified-medical research council, CAT: COPD assessment test

Table 3: Affecting factors on anxiety/depression according to multiple regression analysis

| Independent variables* | Anxiety | | Depression | |
|------------------------|-------------|--------------|-------------|--------------|
| | Stand. beta | p | Stand. beta | p |
| Gender | -0.196 | 0.012 | -0.111 | 0.187 |
| Age | -0.275 | 0.002 | -0.106 | 0.273 |
| Number of complaints | 0.329 | 0.003 | 0.242 | 0.044 |
| Comorbidity | 0.175 | 0.027 | 0.175 | 0.043 |
| Severity of COPD | 0.194 | 0.028 | 0.194 | 0.044 |
| Constant | | 0.001 | | 0.030 |

*In addition to the variables in the table, the socioeconomic level, number of emergency applications, smoking status, and regular sports were included in the model. However, in the analysis, these variables were not related to anxiety/depression. COPD: Chronic obstructive pulmonary disease

Discussion

Anxiety/depression are the most common mental disorders that accompany COPD and affect the success of treatment. Such disorders, which occur in the majority of chronic diseases, have been tried to be explained by the reaction to the disease, limitations, and obstacles caused by the disease.^[3, 8-10] Anxiety/depression occurring in COPD patients may be primary or developed depending on COPD. Therefore, higher rates of mental disorders are expected in COPD patients compared with the normal population.^[4, 5] Another important aspect, whether it is primary or developed due to COPD, is that mental disorders, especially when anxiety and depression are not treated, decrease the quality of life by influencing the social life and physical activity negatively, have a negative effect on the success of treatment, cause exacerbations and increased mortality.^[8, 9] Therefore, the detection and treatment of anxiety/depression have great importance in COPD patients.

Various anxiety/depression ratios have been reported in patients with COPD. In general, depression has been reported in a wide range of COPD patients.^[11-14] It is thought that this high variability may be related to differences between the screening/diagnosis methods, besides the severity of disease and the sociodemographic characteristics of patients with COPD in the studies.

Anxiety between 12% and 44% and depression between 27% and 70% have been reported in studies conducted in our country and using the HAD scale.^[15-19] Reported rates of depression are higher than anxiety. In a study from Iran, it was reported that depression was more common than

anxiety in COPD patients.^[20] Anxiety was found in 8.6% of our patients and depression in 21.6% according to the HAD scale. Although anxiety/depression rates in our study were relatively low, our depression rate was higher than anxiety, and in this respect, our study is compatible with the previous studies. The rate of COPD with at least one anxiety or depression is 23.4%. In other words, one out of every four COPD patients has anxiety/depression problems.

Although different rates are reported in different studies, the only constant finding is high anxiety/depression frequencies found in COPD patients. However, the main problem is that despite this high incidence, this condition cannot be treated as it is not frequently noticed by healthcare professionals. In our study, while the prevalence of psychiatric problems in the medical history of the patients was 4.6%, high frequency of anxiety/depression problems (23.4%) was detected during screening, and these patients were referred for psychiatric support.

When the HAD scale subscores were examined, the HAD-A score was 4.7 and the HAD-D score was 5.0. When studies conducted with HAD-scale in COPD patients in our country were analyzed, different results drew attention. It was seen that HAD-A score varied between 7.4 and 14.3 and HAD-D score varied between 8.6 and 13.7.^[15-19]

In general, higher HAD scores were reported in these studies compared with our findings. For example, HAD-A (14.2) and HAD-D (13.6) scores reported by Anar and colleagues were quite high.^[19] In the study conducted in Switzerland, scores reported were close to our finding.^[21] These differences are thought to be originated from the factors related to differences of sample groups (SEL

gender, etc.), the severity of COPD cases, etc. Another finding obtained from our study is that there is a significantly high correlation between anxiety and depression scores ($r=0.61$). A similar relationship has been reported in many studies.^[12, 18, 22] These results show that anxiety and depression trigger each other.

Many factors affecting the anxiety/depression status of the patient with COPD have been reported previously. Dyspnea, emergency/hospital admissions, cigarette consumption, and SEL are some of these factors.^[21-26] Similarly, in our study, while many factors related to anxiety/depression were observed in pairwise comparisons, the number of “effective factors” decreased in multiple analysis. In multiple analysis, three main factors were found to affect both anxiety and depression levels adversely. These are the comorbidity, high number of complaints, and severity of COPD.

The relationship between the complaints in COPD and anxiety/depression has been mentioned in many studies. The most associated complaint is dyspnea. The relationship between dyspnea and anxiety/depression has been reported.^[12, 15, 18, 23] It has been suggested that anxiety and acute dyspnea attacks are closely related in patients with COPD.^[24]

In our study, we also investigated the relationship between anxiety/depression and the three most common complaints (dyspnea, cough, and sputum) in COPD patients. In multiple analysis, no relationship was found between these three symptoms and the frequency of anxiety/depression. On the other hand, “number of complaints” remained to be an effective factor. As the number of complaints increased, both anxiety/depression scores and frequencies increased significantly.

The prevalence of anxiety reached 15% in those with three or more complaints, while there was no anxiety in those with no complaints. A similar increase (from 11% to 30%) was observed in depression.

In summary, the anxiety/depression level of COPD patients is not affected by the type of complaint, but it is affected by the “excess number of complaints”. Especially those with COPD who have “three or more complaints” should be evaluated in terms of anxiety/depression.

One of the remarkable findings in our study was the high correlation between m-MRC and CAT scores indi-

cating the level of symptoms in COPD and HAD scale scores. This correlation indicates that as the symptoms increase, the psychology of the person is affected negatively and the anxiety/depression state increases. A strong relationship has been reported between m-MRC and HAD in a study conducted by Kapisız and colleagues.^[18] Similarly, Pascal et al.^[27] reported a strong relationship between CAT, m-MRC, and HAD. Our study is important because a correlation between both CAT and m-MRC and HAD score in COPD patients was shown in our study. It was striking that the relationship between CAT and HAD was stronger than m-MRC and HAD. These data indicate that the COPD patients with high CAT (or m-MRC) scores should be evaluated in terms of anxiety/depression.

The second factor affecting anxiety/depression status in multiple analysis was “the severity of the COPD.” The severity of the disease affected both anxiety and depression negatively. It was observed that especially “severe” COPD patients were affected negatively. There are studies showing the relationship between the severity of the disease and anxiety/depression. Increased anxiety/depression frequencies (anxiety 50%–75%, depression 37%–71%) in severe COPD have been reported in a review.^[14, 22] Another study reported the relationship between COPD severity and depression.^[23] Our findings were similar in this respect. Although our rates were lower, the frequency of anxiety/depression increased significantly as the severity of COPD increased. Therefore, we suggest evaluating severe COPD patients in terms of anxiety/depression.

Comorbidity is another factor affecting the patient’s anxiety/depression status. Studies have reported that comorbidities affect the severity and the course of COPD.^[24-26] COPD is a life-challenging disease, so, an addition of a second disease can disrupt the patient’s psychology. Studies have reported that the presence of comorbidity increases the level of anxiety and depression in COPD patients.^[11, 12, 19] The frequency of comorbidity (76%) was quite high in our study. In multiple analysis, it was found that the presence of comorbidity affected the frequency of both “anxiety” and “depression” negatively. Therefore, we suggest evaluating the COPD patients with comorbidity in terms of anxiety/depression.

The frequency of anxiety was significantly higher in women than in men ($p=0.01$). However, no relationship was found between gender and depression. There are

studies showing the relationship between depression and gender in COPD patients, as well as studies that do not show any relationship.^[12, 16]

One of the factors analyzed in our study was age. There are studies reporting the relationship between age and anxiety/depression, as well as studies that could not find a relationship.^[16, 19, 24] In multiple analysis, an inverse relationship was found between “age” and “anxiety.” The mean age of our patients was 66 years. It was observed that anxiety was higher at younger ages. Anxiety score, which was 7.2 at age ≤ 50 , decreased with age and dropped to 3.76 at age ≥ 70 . As time progresses, acceptance and/or compliance to the disease increases. It may be the reason for that decrease.

In summary, anxiety/depression disorders are a group of diseases that should not be overlooked and investigated in patients with COPD.

Conclusion

In our study, anxiety/depression was found in one of every four COPD patients. Many are unknown and overlooked. The HAD scale is a diagnostic tool that can be used for anxiety/depression in COPD patients. It would be beneficial for the physicians participating in the treatment of COPD to benefit from HAD to detect possible anxiety/depression disorders.

Especially those with high CAT or m-MRC test scores, female patients, those with severe COPD, and those with high comorbidity and a high number of symptoms are the patients with a high risk of anxiety/depression. Putting HAD scale into practice in routine will be helpful for the identification and guidance of the patients who need treatment for anxiety/depression because an anxiety/depression-related condition is important in terms of evaluating COPD as an acute attack. This situation will bring an extra health burden by leading to emergency admission and hospitalization.

Conflicts of interest

There are no conflicts of interest.

Ethics Committee Approval

The study was approved by the Akdeniz University Faculty of Medicine Clinical Research Ethics Committee (No: 201-KAEK-20, Date: 27/11/2019).

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Peer-review

Externally peer-reviewed.

Authorship Contributions

Concept – N.B.; Design – N.B.; Supervision – N.B.; Funding – N.B.; Materials – H.D., N.B.; Data collection &/or processing – A.İ.B., H.D.; Analysis and/or interpretation – A.İ.B.; Literature search – A.İ.B., N.B.; Writing – H.D., N.B.; Critical review – H.D., A.İ.B., N.B.

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