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RESEARCH ARTICLE

The role of pulse oximeter in anxiety and exacerbations in COPD patients: A prospective observational study

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ABSTRACT

The role of pulse oximeter in anxiety and exacerbations in COPD patients: A prospective observational study

Introduction: Pulse oximeter is commonly used by chronic obstructive pulmonary disease (COPD) patients for long-term oxygen therapy (LTOT) to monitor oxygen levels. This study investigated the association between oximeter use, anxiety severity, symptom burden, and healthcare utilization in this population.

Materials and Methods: This prospective observational study included 110 individuals with COPD who underwent LTOT. Data were collected on pulmonary function, modified Medical Research Council (mMRC) scores, and daily pulse oximeter use. Anxiety severity was assessed using the Beck Anxiety Inventory (BAI). Healthcare utilization in the previous year, including outpatient-treated and inpatient-treated exacerbations, intensive care unit admissions, and non-exacerbation-related hospital admissions, was analyzed. Linear regression analysis was performed to identify the independent predictors of non-exacerbation-related hospital admissions.

Results: Among the participants, 68 (61.8%) reported using a home pulse oximeter. There were no significant differences in BAI scores ($p=0.678$), oxygen therapy duration ($p=0.530$), or mMRC scores ($p=0.251$) between the groups. However, non-users had significantly higher rates of non-exacerbation-related hospital admissions than users ($p<0.001$). In multivariable analysis, not using pulse oximeter independently predicted more non-exacerbation-related admissions ($B=1.63$, 95% CI: 0.94-2.32, $p<0.001$), whereas anxiety and physiological measures were not significant.

Conclusion: Pulse oximeter use was not associated with anxiety or symptom severity among the patients with COPD receiving LTOT. However, non-use of pulse oximeter was independently associated with increased non-exacerbation-related hospital admissions. These findings suggest that pulse oximeter may support patient self-management and reduce unnecessary healthcare utilization, without contributing to anxiety.

Key words: Pulse oximeter; self-management; health education; COPD

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Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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ÖZ

KOAH hastalarında pulse oksimetre kullanımının anksiyete ve alevlenmeler üzerine etkisi: Prospektif gözlemsel bir çalışma

Giriş: Kronik obstrüktif akciğer hastalığı (KOAH) tanılı hastalar, uzun süreli oksijen tedavisi (LTOT) sırasında oksijen düzeylerini izlemek amacıyla sıklıkla pulse oksimetre kullanmaktadır. Bu çalışma, bu hasta grubunda oksimetre kullanımının anksiyete şiddeti, semptom yükü ve sağlık hizmeti kullanım sıklığı ile ilişkisini araştırmayı amaçlamıştır.

Materyal ve Metod: Bu prospektif gözlemsel çalışmaya uzun süreli oksijen tedavisi almakta olan 110 KOAH hastası dahil edilmiştir. Katılımcıların solunum fonksiyonları, modifiye Medical Research Council (mMRC) skalası skorları ve günlük pulse oksimetre kullanımları kaydedilmiştir. Anksiyete şiddeti, Beck Anksiyete Envanteri (BAI) ile değerlendirilmiştir. Son bir yıl içindeki sağlık hizmeti kullanımı; poliklinik veya hastanede tedavi edilen alevlenmeler, yoğun bakım ünitesine yatışları ve alevlenmeye bağlı olmayan hastane başvuruları şeklinde analiz edilmiştir. Alevlenmeye bağlı olmayan hastane başvurularının bağımsız belirleyicilerini değerlendirmek amacıyla lineer regresyon analizi yapılmıştır.

Bulgular: Katılımcıların 68 (%61.8)'i pulse oksimetre kullandığını bildirmiştir. Oksimetre kullanıcıları ve kullanıcı olmayanlar arasında BAI skoru ($p=0.678$), oksijen tedavisi süresi ($p=0.530$) ve mMRC skoru ($p=0.251$) açısından anlamlı fark saptanmamıştır. Ancak oksimetre kullanmayan hastalarda, kullanıcı olanlara kıyasla anlamlı düzeyde daha yüksek oranlarda alevlenme dışı hastane yatışı bildirilmiştir ($p<0.001$). Çok değişkenli analizde pulse oksimetre kullanmamak, alevlenmeye bağlı olmayan hastane başvurularının bağımsız bir belirleyicisi olarak saptanmıştır ($B=1.63$; %95 GA: 0.94-2.32; $p<0.001$); anksiyete düzeyi ve fizyolojik parametreler ise anlamlı bulunmamıştır.

Sonuç: KOAH nedeniyle LTOT uygulanan hastalarda pulse oksimetre kullanımı, anksiyete veya semptom şiddeti ile ilişkili bulunmamıştır. Bununla birlikte pulse oksimetre kullanılmaması, alevlenme dışı hastane başvurularında artış ile bağımsız olarak ilişkili bulunmuştur. Bu bulgular, pulse oksimetrenin anksiyeteye neden olmadan hasta öz yönetimini destekleyebileceğini ve gereksiz sağlık hizmeti kullanımını azaltabileceğini düşündürmektedir.

Anahtar kelimeler: Pulse oksimetre; öz yönetim; sağlık eğitimi; KOAH

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) places a significant economic burden on both the individuals and society, and exacerbations intensify these costs. According to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) classification, disease severity correlates with an increased frequency of exacerbations and higher associated healthcare expenses (1,2). Individuals with COPD are twice as likely to develop depression and anxiety as those without the disease (3). These comorbid mental health conditions contribute to worsened COPD outcomes, including a higher frequency of exacerbations and increased mortality rates (4). As the symptoms progress, patients often experience reduced physical activity, muscle deconditioning, sarcopenia, and social isolation, which can further exacerbate dyspnea-related anxiety and depression.

Long-term oxygen therapy (LTOT) is a crucial treatment for COPD patients with severe resting hypoxemia. LTOT is typically indicated when the partial pressure of oxygen (PaO_2) ≤ 55 mmHg or oxygen saturation of arterial blood (SaO_2) $\leq 88\%$, or when PaO_2 is between 55-60 mmHg or SaO_2 is 88% in the presence of pulmonary hypertension, congestive heart failure, or polycythemia (5). Depression and anxiety have been reported in up to 62% of LTOT cases (6).

Pulse oximeter is a noninvasive and widely used technique that measures oxygen saturation by spectrophotometrically detecting oxygenated and deoxygenated hemoglobin (7). These devices, which are essential in hospitals, sleep studies, and intensive care units, have become increasingly popular for home monitoring among patients with COPD. Despite concerns that pulse oximeter may sometimes misclassify the need for LTOT, its use has expanded significantly, particularly since the COVID-19 pandemic (8). This increased adoption has facilitated the earlier detection of exacerbations, improved self-management, and timely medical interventions (9).

This study aimed to investigate the associations between pulse oximeter use, anxiety severity, symptom burden, and healthcare utilization in COPD patients receiving LTOT.

MATERIALS and METHODS

This prospective, observational cohort study was conducted between October 2022 and February 2024 at the Department of Pulmonology. The study adhered to the ethical principles of the Helsinki Declaration and was approved by the Ethics Committee of Erciyes University (Meeting Date: 28/09/2022, Decision Number: 2022/674).

In total, 212 patients diagnosed with COPD by a specialist were screened. Eligible participants includ-

ed those who were undergoing follow-up or presented with respiratory symptoms such as dyspnea and cough, had COPD risk factors according to GOLD guidelines, and demonstrated a post-bronchodilator forced expiratory volume in the first one second (FEV₁) to forced vital capacity (FVC) ratio (FEV₁/FVC) of less than 70%.

COPD classification

COPD severity and follow-up risk were categorized according to the 2024 GOLD ABE scheme. Group B was defined as symptomatic disease [COPD assessment test (CAT) ≥ 10 or mMRC ≥ 2] with ≤ 1 moderate exacerbation and no prior exacerbation-related hospitalization in the preceding 12 months; Group E as an exacerbation-predominant phenotype (≥ 2 moderate exacerbations or ≥ 1 exacerbation leading to hospitalization within 12 months). Since all participants were receiving LTOT and were symptomatic, no Group A patients were identified.

Treatable traits

Consistent with GOLD follow-up recommendations, dyspnea and exacerbation burden were pre-specified treatable traits. Dyspnea was assessed using the modified Medical Research Council (mMRC) scale and CAT score (10,11). Exacerbation burden was quantified as the number of outpatient-managed exacerbations and COPD-related hospitalizations during the prior 12 months, derived from patient report and confirmed in the electronic health record.

Exclusion criteria

Patients with active, primary or metastatic lung malignancies, chronic respiratory failure due to causes other than COPD, or a history of psychiatric disorders were excluded from the study. Additionally, individuals who were under psychiatric follow-up or had used antidepressant medications at any time were excluded. After applying these exclusion criteria, 110 COPD patients receiving LTOT at home who provided informed consent were included in the study (Figure 1).

Comorbidity burden was further assessed using the COPD-specific comorbidity test (COTE), which assigns weighted scores to 12 comorbidities predictive of mortality in COPD (12).

Data collection and assessment

For each participant, respiratory function parameters, COPD grouping according to GOLD classification,

home pulse oximeter use (status and frequency), mMRC score, and duration of LTOT were prospectively and sequentially recorded. Information regarding healthcare utilization in the past year was obtained through a combination of patient self-reports and electronic medical record reviews. Participants were asked whether they had consulted a physician for any COPD-related symptoms. Exacerbations managed in the outpatient setting, defined as worsening of symptoms requiring the prescription of systemic corticosteroids and/or antibiotics without hospitalization, were recorded as outpatient-managed exacerbations.

In addition to outpatient-managed exacerbations, data on hospitalizations due to COPD exacerbations and admissions to the intensive care unit (ICU) were collected. Based on the total number of COPD-related healthcare encounters, a separate category, non-exacerbation of COPD-related admissions, was derived by subtracting the number of hospitalizations and outpatient-managed exacerbations from the total number of reported visits for COPD symptoms.

Anxiety assessment

Anxiety symptoms were assessed using the Beck Anxiety Inventory (BAI), a 21-item self-report instrument developed to measure the severity of anxiety in clinical and non-clinical populations. Each item describes a common symptom of anxiety and is scored on a 4-point Likert scale ranging from 0 (not at all) to 3 (severely). The total score ranges from 0 to 63, with higher scores indicating more severe anxiety. For interpretative purposes, total BAI scores were classified as follows: 0-7 (minimal), 8-15 (mild), 16-25 (moderate), and 26-63 (severe anxiety).

All participants completed the BAI during in-person interviews conducted by the research team at the outpatient clinic. Standardized instructions were provided, and informed consent was obtained from all participants before the assessment.

Statistics

Statistical analyses were performed using IBM SPSS Statistics for Windows, version 16.0, and R software (version 4.4.3). Post hoc power analysis was performed using the G*Power software (version 3.1.9.4, Heinrich-Heine University, Düsseldorf, Germany). Descriptive statistics were used to summarize the demographic and clinical characteristics. For normally distributed continuous variables, data were

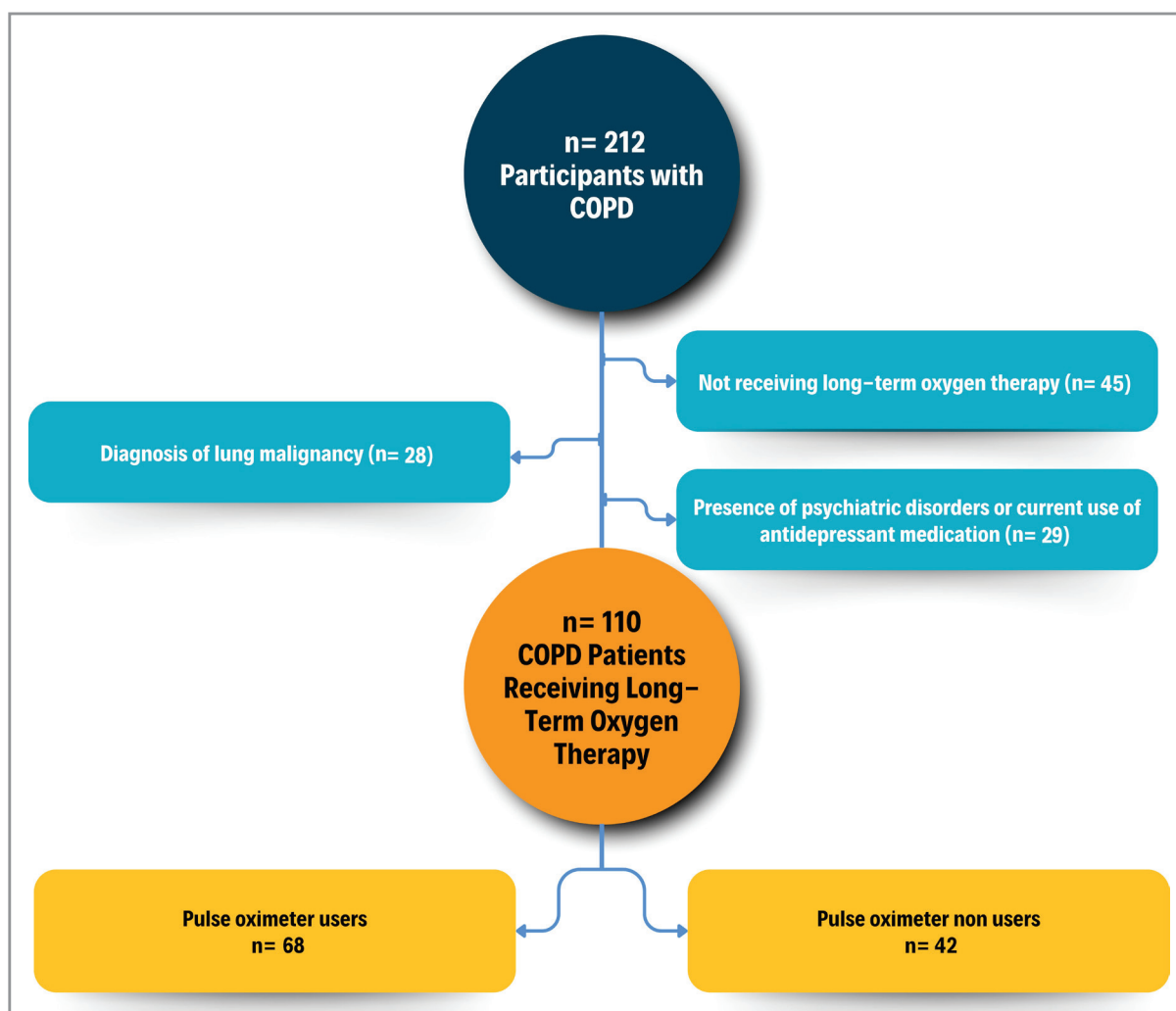


Figure 1. A flowchart illustrating the selection process of patients with COPD receiving long-term oxygen therapy was included in the study.

presented as mean $\pm$ standard deviation (SD), whereas non-normally distributed variables were summarized as median and interquartile range (IQR). Normality of continuous variables was assessed using the Shapiro-Wilk test in addition to visual inspection of Q-Q plots. Categorical variables are reported as frequencies and percentages. Inter-group comparisons were performed using the independent samples t-test or Mann-Whitney U test for continuous variables, depending on normality, and Pearson's chi-square test was used for categorical variables.

The association between anxiety severity (based on BAI categories) and clinical variables (e.g., mMRC score, FEV₁, hospitalization rates) was assessed using

the Kruskal-Wallis test and post hoc pairwise comparisons, where appropriate.

Correlations between continuous variables (e.g., FEV₁, mMRC, BAI scores) were evaluated using Pearson's correlation coefficient. A multivariable linear regression model was constructed to identify predictors of non-exacerbation-related hospital admissions. Variables included in the model were pulse oximeter use status, BAI category, age, BMI, FEV₁ (L), and GOLD group classification (E vs. B), based on univariate analysis results ($p < 0.10$). All p-values were two-sided, and a p -value < 0.05 was considered statistically significant.

RESULTS

A total of 110 patients with COPD receiving LTOT were included in the study. Of these, 68 (61.8%) reported regular use of a home pulse oximeter. By GOLD ABE classification, all participants were distributed between Groups B and E; no Group A cases were observed due to universal symptomatic status under LTOT. Specifically, 26.5% of oximeter users and 26.2% of non-users were in Group B, while 73.5% of the users and 73.8% of the non-users were classified as Group E.

No statistically significant differences were observed between oximeter users and non-users in terms of demographic characteristics (age, sex, BMI), smoking status, duration of oxygen therapy, or pulmonary function test results. Median daily oxygen usage time was also similar between the groups (10.0 vs. 8.0 hours, $p=0.150$). COTE scores were uniformly low in both groups (median [IQR] 0 [0] vs 0 [0], $p=0.88$). The proportion of patients with a COTE score >0 was also similar between users and non-users (1.5% vs. 4.8%, $p=0.56$) (Table 1).

Table 1. Comparative analysis of clinical characteristics in copd patients undergoing long-term oxygen therapy (LTOT) between pulse oximeter users and non-users

	Pulse oximeter users (n= 68)	Pulse oximeter non-users (n= 42)	p
Age	66.36 ± 5.2	66.50 ± 4.7	0.895
Sex (Female, %)	51 (75)	34 (80.95)	0.469
Smoking status (%)			
Smoker	13 (19.12)	8 (19.05)	0.709
Never smoked	12 (17.64)	5 (11.91)	
Ex-smoker	43 (63.24)	29 (69.05)	
Oxygen usage time (hour/day)	8 [10.5]	10 [12.8]	0.150
Body mass index	29.6 ± 8.18	28.2 ± 6.26	0.514
FEV ₁ /FVC (%)	55.0 [20.3]	52.5 [22.0]	0.631
FEV ₁ (%)	43.0 [17.3]	45.5 [39.8]	0.307
FEV ₁ (lt)	1.05 [0.4]	1.2[0.5]	0.558
mMRC score	3.00 [1.0]	3.00 [1.0]	0.251
ICU admission due to exacerbation	0.00 [0.0]	0.00 [0.7]	0.581
Hospitalization due to COPD last year	1.00 [1.0]	1.00 [2.0]	0.125
Outpatient-managed exacerbations	1.00 [2.0]	2.00 [1.0]	<.001
Non-exacerbation COPD-related admissions	3.00 [3.2]	5.00 [2.0]	<.001
ICU hospitalization status (%)	15 (22.06)	11 (26.19)	0.620
COPD stage (%)			
A	0 (0)	0 (0)	0.974
B	18 (26.47)	11 (26.19)	
E	50 (73.53)	31 (73.81)	
Beck anxiety score category, n (%)			
Mild	43 (63.24)	23 (54.76)	0.678
Moderate	13 (19.12)	10 (23.81)	
Severe	12 (17.65)	9 (21.43)	

Table 1. Comparative analysis of clinical characteristics in copd patients undergoing long-term oxygen therapy (LTOT) between pulse oximeter users and non-users (continue)			
	Pulse oximeter users (n= 68)	Pulse oximeter non-users (n= 42)	p
Comorbidities			
DM	12 (17.65)	8 (19.04)	0.987
HT	18 (26.47)	12 (28.57)	0.829
CAD	10 (14.71)	7 (16.66)	0.792
Other	6 (8.82)	5 (11.91)	0.745
COTE score (median) [IQR]	0 [0] (0-6)	0 [0] (0-2)	0.88
Note: Continuous variables are presented as median [interquartile range, IQR] unless otherwise indicated; normally distributed data are expressed as mean ± standard deviation. p values were calculated using student's t test for normally distributed continuous variables, Mann–Whitney U test for non-normally distributed continuous variables, and Pearson's chi-square test for categorical variables. FEV ₁ : Forced expiratory volume in the first second, FVC: Forced vital capacity, mMRC: Modified medical research council, COPD: Chronic obstructive pulmonary disease, ICU: Intensive care unit, LTOT: Long-term oxygen therapy.			

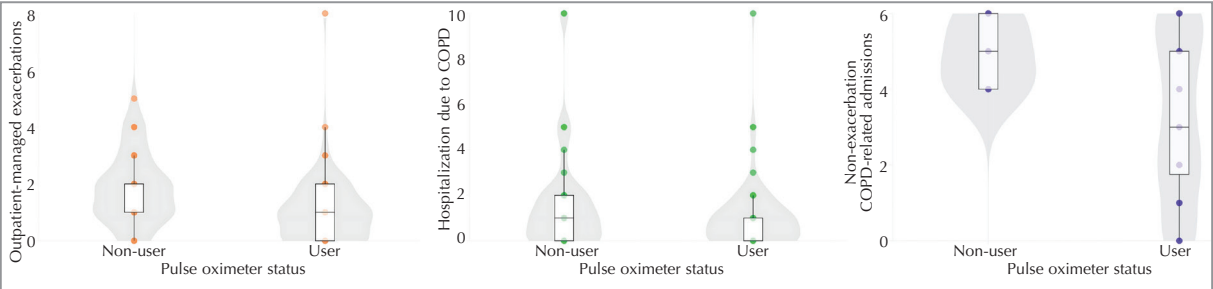


Figure 2. Comparison of healthcare utilization outcomes between pulse oximeter users and non-users among COPD patients receiving long-term oxygen therapy.

There were no significant differences between oximeter users and non-users with respect to anxiety levels ($p= 0.678$), mMRC scores ($p= 0.251$), or ICU admissions due to COPD exacerbation. However, non-users had significantly higher rates of non-exacerbation-related hospital admissions ($p< 0.001$) and outpatient-managed exacerbations ($p< 0.001$) compared to users (Figure 2).

When clinical outcomes were analyzed based on BAI severity classification, there were no statistically sig-

nificant differences in the median number of outpatient-managed exacerbations ($p= 0.776$), non-exacerbation-related admissions ($p= 0.140$), or mMRC scores ($p= 0.133$) across mild, moderate, and severe anxiety groups (Table 2). Although hospitalization rates showed a trend toward increase with greater anxiety severity, the association did not reach statistical significance ($p= 0.051$).

In the multivariable linear regression analysis, non-use of pulse oximeter remained an independent

Table 2. The relationship between hospital admission, hospitalization, intensive care unit admission and mMRC scores according to the beck anxiety inventory				
	Mild	Moderate	Severe	p
Non-exacerbation COPD-related admissions	4 [3]	4 [3.5]	5 [2]	0.140
Outpatient-managed exacerbations	1 [2]	1 [0.5]	1 [1]	0.776
Hospitalization due to COPD	0.5 [1.75]	1 [0]	1 [1]	0.051
ICU admission due to exacerbation	0 [0]	0 [1]	0 [0]	0.331
mMRC	2 [1]	3 [1]	3 [2]	0.133
Note: Continuous variables are expressed as median [interquartile range, IQR]. Between-group comparisons were performed using the Kruskal-Wallis test across Beck Anxiety Inventory categories (mild, moderate, severe). COPD: Chronic obstructive pulmonary disease, ICU: Intensive care, mMRC: Modified medical research council.				

Table 3. Summary of linear regression analysis evaluating predictors of non-exacerbation-related hospital admissions among COPD patients receiving long-term oxygen therapy

Predictor Variable	Estimate (B)	SE	95% CI Lower	95% CI Upper	p
Intercept	1.77	2.47	-3.06	6.61	0.474
Beck anxiety score					
Moderate vs. mild	0.19	0.43	-0.65	1.04	0.654
Severe vs. mild	0.82	0.44	-0.05	1.69	0.067
BMI	-0.01	0.02	-0.05	0.04	0.712
FEV ₁ (lt)	0.24	0.34	-0.43	0.91	0.485
Age	0.02	0.03	-0.05	0.08	0.589
Pulse oximeter use					
Non-user vs. user	1.63	0.35	0.94	2.32	<0.001
COPD stage					
E vs. B	0.01	0.39	-0.76	0.78	0.978

Note: Linear regression analysis was performed to identify predictors of non-exacerbation-related hospital admissions. Variables included in the model were Beck Anxiety Inventory categories, BMI, FEV₁ (L), age, pulse oximeter use, and COPD stage (Group E vs B). B, regression coefficient. SE: Standard error, CI: Confidence interval, COPD: Chronic obstructive pulmonary disease, FEV₁: Forced expiratory volume in one second, BMI: Body mass index.

predictor of higher non-exacerbation-related hospital admissions (B= 1.63, 95% CI: 0.94-2.32, $p < 0.001$). Severe anxiety was associated with more frequent hospitalizations (B= 0.82, 95% CI: -0.05 to 1.69, $p = 0.067$), while moderate anxiety was not significantly different from mild anxiety (B= 0.19, $p = 0.654$) (Table 3).

A post hoc power analysis was conducted to assess the adequacy of the sample size in detecting the difference in non-exacerbation-related admissions between the groups. Based on group sizes ($n = 68$ vs. $n = 42$) and the observed effect size (Cohen's $d = 0.98$), the calculated power was 99.86% at $\alpha = 0.05$, confirming the high reliability of the detected difference (13).

DISCUSSION

To our knowledge, this is among the first studies to explore the relationship between home pulse oximeter use, anxiety, and healthcare utilization in COPD patients receiving LTOT. In this study involving individuals with COPD receiving LTOT, pulse oximeter use was not associated with increased anxiety levels, ICU admission due to exacerbation, or hospitalization due to COPD. However, individuals who did not use pulse oximeter experienced significantly more non-exacerbation COPD-related hospital admissions and outpatient-managed exacerbations than users.

It is also possible that individuals who regularly use pulse oximeter are more engaged in disease management and better able to recognize worsening symptoms at an earlier stage, which may contribute to reduced outpatient-managed exacerbations and fewer hospital-based encounters. In our study, lower rates of outpatient-managed exacerbations among pulse oximeter users were not accompanied by higher anxiety levels, suggesting that enhanced symptom monitoring does not necessarily lead to increased psychological distress.

Depression and anxiety are common comorbidities in patients with COPD and often present together (14,15). However, the exact mechanisms underlying the increased prevalence of depression and anxiety in COPD patients remain unclear. In stable COPD, anxiety affects 10-19% of patients, while post-exacerbation depression and anxiety range from 19.4-50% and 9.3-58%, respectively (14,16,17). In severe cases, meta-analyses have reported anxiety rates between 50% and 75% (18). If left untreated, these conditions contribute to higher rates of acute exacerbations, more frequent hospital visits, increased hospital admissions, and elevated mortality risk (19). In our linear regression analysis, we observed an association between severe and mild anxiety levels and the number of clinically defined exacerbations, although this association was not statistically significant. This finding may be attributed to the small sample size.

COPD and anxiety symptoms frequently overlap, complicating diagnosis. Anxiety may present acutely with dyspnea and tachypnea or chronically as persistent worry affecting daily life (2). Although higher mMRC scores were observed in those with moderate-to-severe anxiety, no significant association was found between mMRC and BAI categories ($p=0.133$), nor between anxiety levels and COPD-related hospitalizations in the past year ($p=0.051$). In linear regression, severe anxiety was linked to increased non-exacerbation-related admissions ($p=0.067$), indicating a potential—but not statistically significant—relationship between psychological distress and healthcare utilization in COPD.

FEV₁ is a well-established marker for COPD progression and mortality; however, in our study, it was not significantly associated with anxiety levels or non-exacerbation-related hospital admissions (5). Similarly, although the mMRC scores tended to be higher in patients with greater anxiety, this association was not statistically significant. These findings suggest that neither FEV₁ nor mMRC alone adequately capture the relationship between COPD severity and psychological distress. The absence of a significant correlation between anxiety and objective lung function, along with the weak association observed with mMRC scores, indicates that anxiety in COPD may be more closely linked to patients' perceived symptom burden than physiological impairment. This underscores the importance of incorporating patient-reported outcomes into clinical assessments, to better understand the psychological dimensions of COPD.

This study had several limitations. First, it was conducted in a single center setting with a relatively small sample size, which may limit the generalizability of the findings. Second, the observational design precludes the establishment of causal relationships between pulse oximeter use and health care utilization. Third, anxiety was assessed using a single self-report questionnaire (BAI) and no clinical interviews or expert psychiatric evaluations were performed to validate anxiety severity. Additionally, the frequency and context of pulse oximeter use were based on patient reports and were not monitored objectively. Finally, potential confounding factors such as comorbid psychiatric conditions or prior health literacy levels were not systematically evaluated.

CONCLUSION

Among the patients with COPD receiving LTOT, pulse oximeter was not associated with increased anxiety levels. Although individuals with severe anxiety tended to have higher healthcare utilization, this association did not reach statistical significance. Notably, the non-users of pulse oximeter experienced significantly more non-exacerbation-related hospital admissions, suggesting that regular oximeter may contribute to better symptom interpretation and reduce unnecessary hospital visits. These findings support the potential role of home pulse oximeter in optimizing self-management and reducing unnecessary healthcare use among COPD patients on LTOT.

Ethical Committee Approval: This study was approved by Clinical Research Ethics Committee of Erciyes University Faculty of Medicine (Decision no: 2022/674, Date: 28.09.2022).

Peer-review: Externally peer-reviewed.

CONFLICT of INTEREST

The authors declare that they have no conflict of interest.

AUTHORSHIP CONTRIBUTIONS

Concept/Design: NAY, İG, FYE

Analysis/Interpretation: NAY, FYE, BB, BR

Data acquisition: FYE, NAY, NT, İG

Writing: NAY, NT, İG

Clinical Revision: NAY, NT, BB, BR

Final Approval: NAY, İG, NT

REFERENCES

1. Løkke A, Lange P, Lykkegaard J, Ibsen R, Andersson M, de Fine Licht S, et al. Economic burden of COPD by disease severity - a nationwide cohort study in Denmark. *Int J Chron Obstruct Pulmon Dis* 2021; 16: 603-13. <https://doi.org/10.2147/COPD.S295388>
2. Eisner MD, Blanc PD, Yelin EH, Katz PP, Sanchez G, Iribarren C, et al. Influence of anxiety on health outcomes in COPD. *Thorax* 2010; 65(3): 229-34. <https://doi.org/10.1136/thx.2009.126201>
3. Xie H, Jiang Y, Liu L, Peng H, Li J, Chen Z. Global prevalence and risk factors of depression in patients with chronic obstructive pulmonary disease: A systematic review and meta-analysis from 2000 to 2022. *J Psychosom Res* 2023; 175: 111537. <https://doi.org/10.1016/j.jpsychores.2023.111537>

4. Atlantis E, Fahey P, Cochrane B, Smith S. Bidirectional associations between clinically relevant depression or anxiety and COPD: A systematic review and meta-analysis. *Chest* 2013; 144(3): 766-77. <https://doi.org/10.1378/chest.12-1911>
5. Venkatesan P. GOLD COPD report: 2025 update. *Lancet Respir Med* 2025; 13(1): e7-e8. [https://doi.org/10.1016/S2213-2600\(24\)00413-2](https://doi.org/10.1016/S2213-2600(24)00413-2)
6. de Miguel-Díez J, Lopez-de-Andres A, Jimenez-Garcia R, de Miguel-Yanes JM, Hernández-Barrera V, Carabantes-Alarcon D, et al. National trends in prevalence of depression in men and women with chronic obstructive pulmonary disease hospitalized in Spain, 2016-2020. *J Clin Med* 2022; 11(21): 6337. <https://doi.org/10.3390/jcm11216337>
7. Hanning CD, Alexander-Williams JM. Pulse oximetry: A practical review. *BMJ* 1995; 311(7001): 367-70. <https://doi.org/10.1136/bmj.311.7001.367>
8. Crooks CJ, West J, Morling JR, Simmonds M, Juurlink I, Cruickshank S, et al. Pulse oximetry has limited utility in identifying potential patients for long-term oxygen therapy. *Int J Tuberc Lung Dis* 2024; 28(5): 253-5. <https://doi.org/10.5588/ijtld.23.0491>
9. MacNab M, Lee SH, McCloughan L, Hanley J, McKinstry B, Pinnock H. Oximetry-supported self-management for chronic obstructive pulmonary disease: mixed method feasibility pilot project. *BMC Health Serv Res* 2015; 15: 485. <https://doi.org/10.1186/s12913-015-1135-2>
10. Jones PW, Brusselle G, Dal Negro RW, Ferrer M, Kardos P, Levy ML, et al. Properties of the COPD assessment test in a cross-sectional European study. *Eur Respir J* 2011; 38(1): 29-35. <https://doi.org/10.1183/09031936.00177210>
11. Houben-Wilke S, Janssen DJA, Franssen FME, Vanfleteren LEGW, Wouters EFM, Spruit MA. Contribution of individual COPD assessment test (CAT) items to CAT total score and effects of pulmonary rehabilitation on CAT scores. *Health Qual Life Outcomes* 2018; 16(1): 205. <https://doi.org/10.1186/s12955-018-1034-4>
12. Chen Q, Wang X, Yao X, Zhang L, Liu X. COTE and pulmonary comorbidities predict moderate-to-severe acute exacerbation and hospitalization in COPD. *Int J Chron Obstruct Pulmon Dis* 2025; 20: 1893-913. <https://doi.org/10.2147/COPD.S518218>
13. Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behav Res Methods* 2009; 41(4): 1149-60. <https://doi.org/10.3758/BRM.41.4.1149>
14. Volpato E, Toniolo S, Pagnini F, Banfi P. The relationship between anxiety, depression and treatment adherence in chronic obstructive pulmonary disease: A systematic review. *Int J Chron Obstruct Pulmon Dis* 2021; 16: 2001-21. <https://doi.org/10.2147/COPD.S313841>
15. Yohannes AM, Alexopoulos GS. Depression and anxiety in patients with COPD. *Eur Respir Rev* 2014; 23(133): 345-9. <https://doi.org/10.1183/09059180.00007813>
16. Matte DL, Pizzichini MM, Hoepers AT, Diaz AP, Karloh M, Dias M, et al. Prevalence of depression in COPD: A systematic review and meta-analysis of controlled studies. *Respir Med* 2016; 117: 154-61. <https://doi.org/10.1016/j.rmed.2016.06.006>
17. Yohannes AM, Murri MB, Hanania NA, Regan EA, Iyer A, Bhatt SP, et al. Depressive and anxiety symptoms in patients with COPD: A network analysis. *Respir Med* 2022; 198: 106865. <https://doi.org/10.1016/j.rmed.2022.106865>
18. Lacasse Y, Rousseau L, Maltais F. Prevalence of depressive symptoms and depression in patients with severe oxygen-dependent chronic obstructive pulmonary disease. *J Cardiopulm Rehabil* 2001; 21(2): 80-6. <https://doi.org/10.1097/00008483-200103000-00004>
19. Martínez-Gestoso S, García-Sanz MT, Carreira JM, Salgado FJ, Calvo-Álvarez U, Doval-Oubiña L, et al. Impact of anxiety and depression on the prognosis of copd exacerbations. *BMC Pulm Med* 2022; 22(1): 169. <https://doi.org/10.1186/s12890-022-01934-y>