





Mental Health Experience of Adults With Chronic Obstructive Pulmonary Disease and Comorbidities

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Abstract

Although the association is not well understood, people with COPD are likely to suffer from mental health issues such as depression and anxiety. Due to this occurrence, the aim of the present study is to better understand the mental health experience and COPD comorbidities of U.S. adults with a COPD diagnosis. The final sample comprised 1,676 U.S. adults who were surveyed in the 2019 National Health Interview Survey adult public file. Logistic and ordinal regression were used to calculate adjusted odds ratios for comorbid conditions predicting depression, anxiety, and the number of mental health issues, respectively. Depressive symptoms were more common in adults with COPD who also suffered from diabetes, heart disease, stroke, or asthma. Anxiety symptoms were more common in adults with COPD who also suffered from diabetes, heart disease, stroke, asthma or hypertension. For people with COPD, there was a significant difference seen between the prevalence of diabetes, heart attack, stroke, and asthma and the total number of mental health issues. These findings have implications for how mental health and primary care professionals treat COPD and COPD-related comorbidities. Additionally, they have implications for providing individualized treatments for persons living with COPD and related comorbidities.

Keywords: *chronic obstructive pulmonary disease, depression, anxiety, comorbidities, United States, NHIS*

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Introduction

Chronic obstructive pulmonary disease (COPD) is a progressive chronic lung disease that limits airflow and is associated with increased inflammation in the lungs, along with increased comorbidities that include chronic bronchitis and emphysema (Centers for Disease Control and Prevention [CDC], 2021, 2022). Chronic bronchitis is characterized by a persistent cough lasting 3 or more months that limits airflow restriction, whereas emphysema is characterized by structural damage to the alveoli in the lungs (Tony & Abdelrahim, 2022). In the United States, COPD ranks fourth in mortality rates (CDC, 2021, 2022); it affects an estimated 16 million individuals, but many more adults are unknowingly suffering from the disease (Sullivan et al., 2018). COPD normally affects older adults, who tend to become symptomatic between 50 and 60 years of age (Devine, 2008; Pinault et al., 2016). Additionally, patients suffering from COPD underrecognize respiratory symptoms and, therefore, underreport their symptoms to healthcare professionals (Lamprecht et al., 2015).

Research has shown that COPD is associated with mental health problems. Persons with COPD have a higher prevalence of mental distress and are more likely to experience mental distress than those who do not report COPD (Stellefson et al., 2020, 2022). Patients with COPD often display clinically significant symptoms of co-occurring conditions, such as depression and anxiety (Barrueco-Otero et al., 2022; Bugajski et al., 2023; Liu, 2023; Rahi et al., 2023; Tsao et al., 2022; Yohannes, 2021). Depression was found to be associated with inadequate social and emotional support among patients with COPD (Arabyat & Raisch, 2019; Barrueco-Otero et al., 2022; Liu, 2023).

Newly COPD-diagnosed individuals are at an increased risk of depression (Albrecht et al., 2016). Adults living with COPD who have considered suicide are more likely to suffer from major depressive disorder, anxiety, severe dyspnea, frequent hospitalizations due to their condition, and the necessity of supplementary oxygen (Barrueco-Otero et al., 2022; Bugajski et al., 2023; Liu, 2023; Rahi et al., 2023). Additionally, depression and anxiety, when left untreated, are associated with an elevated risk of acute COPD exacerbations, regular use of the emergency department, hospital readmission, and untimely mortality (Bugajski et al., 2023; Liu, 2023; Rahi et al., 2023). Moreover, individual factors associated with anxiety can influence coping with COPD and an individual's quality of life (Arabyat & Raisch, 2019; Thakur et al., 2018). On the other hand, a more positive outlook on current health conditions and better mental health status were associated with enhancing the health-related quality of life for individuals with COPD (Chow et al., 2023; Mewes et al., 2016). However, anxiety and depression are underdiagnosed and undertreated among individuals with COPD (Barrueco-Otero et al., 2022; Bugajski et al., 2023; Liu, 2023; Rahi et al., 2023; Tsao et al., 2022).

Why adults who have COPD have higher rates of depression and anxiety is not clearly understood (Bugajski et al., 2023; Liu, 2023; Rahi et al., 2023). According to the research literature, individual COPD symptoms are more strongly related to symptoms of depression and anxiety than they are to a deterioration in pulmonary function (Barrueco-Otero et al., 2022; Lebowitz et al., 2011; Liu, 2023; Yang et al., 2020). Such intricate connections between chronic disease, physical restrictions, social isolation, physiological effects on the brain, and hereditary factors are likely to contribute to anxiety and depression symptoms in adults living with COPD (Beijers et al., 2022; Bugajski et al., 2023; Liu, 2023; Rahi et al., 2023). The temporary shortness of breath, or tachypnoea, of acute anxiety (consistent with the symptoms of fear or panic), for example, might be mistaken for acute or persistent dyspnea. Also, constantly experiencing anxiety or dread can negatively impact daily life, such as being unable to socialize. COPD and depression have many of the same symptoms, including tiredness (weakness), psychomotor slowness, and cognitive impairment (Barrueco-Otero et al., 2022; Beijers et al., 2022; Bugajski et al., 2023; Liu, 2023). Anxiety can cause or aggravate COPD symptoms and vice versa (Liu, 2023). Depression brought on by a COPD diagnosis and symptoms can exacerbate social isolation, activity limits, and poor medication compliance, all of which can contribute to decreased self-esteem, poor self-management, and an increased risk of acute COPD exacerbations (Barrueco-Otero et al., 2022; Beijers et al., 2022; Bugajski et al., 2023; Liu, 2023; Rahi et al., 2023).

When examining health disparities at their origin, social capital must also be examined, as social capital interacts with other social determinants of health in shaping habits, determining support systems, driving community action, and shaping access to resources. The term *social capital* in the context of social capital theory is used to describe a person's connections, support systems, and material resources (Lin, 2001; Schulz et al., 2017). Social capital can take the form of material support, such as money, or immaterial benefits, such as friendship, or a feeling of support or acceptance. Social capital is typically described as the "connectedness and the quality and quantity of social relations in a given population" (Harpham et al., 2002, p. 106). Prior studies have shown that social capital is strongly associated with health and plays a mediating role in explaining socioeconomic inequities (Lebenbaum et al., 2021). It is unclear, however, whether social capital, in its various psychosocial elements, influences mental health disparities in persons living with COPD.

Purpose of Study

Based on the limited understanding of depression and anxiety among adults living with COPD, the present study sought to answer the following research question: Does a nationally representative U.S. sample show an association between specific COPD comorbidities and mental health outcomes (i.e., depression, anxiety, or both)? Additionally, the current study aimed to enhance COPD treatments for patients by exploring the relationship between clinical and psychological factors.

Methods

Data

The 2019 National Health Interview Survey (NHIS) adult public file is a multistage continuous survey administered in person to noninstitutionalized civilian adults 18 years and older who live in the United States, with occasional follow-up interviews by telephone. A randomly selected adult from each household was tasked with answering questions about their own health, or they used proxies to answer such questions (less than 2% of respondents used proxies). The response rate for the 2019 NHIS was 61.1% (National Center for Health Statistics, 2020). The NHIS collects information on health status, healthcare access, and utilization of healthcare services. Ethical approval and consent were not required for the current study, as it used a publicly available deidentified dataset (see the Statements and Declarations section to see the data availability website location). A total of 31,997 adults participated in the 2019 NHIS survey; of those, a final sample of 1,676 adults reported a COPD diagnosis.

Measures

According to the 2019 NHIS dataset, a reported COPD diagnosis is defined as having been given within the last 12 months by a doctor or other health professional who stated that an individual had COPD, emphysema, or chronic bronchitis (Ward et al., 2017). The dependent variables of interest asked whether individuals had ever had depression (yes/no) and anxiety disorder (yes/no). Each mental health outcome was examined independently and as an ordinal variable by creating a mental health issues ordinal scale (Cronbach's $\alpha = 0.81$) with the following categories: no mental health issues, one mental health issue (anxiety or depression), and both mental health issues (anxiety and depression).

Demographics included in the analyses include: sex (female/male), age (in years), race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, Asian, American Indian/Alaskan Native, other), marital status (ever married/never married), income level (5-point scale: \$0–\$34,999, \$35,000–\$49,999, \$50,000–\$74,999, \$75,000–\$99,999, \$100,000 or greater), body mass index (4-point scale: underweight [below 18.5 kg/m²], normal or healthy weight [18.5–24.9 kg/m²], overweight [25–29.9 kg/m²], obese [30 kg/m² or more]), and cigarette smoking status (never, former smoker, current smoker). Comorbid conditions queried

included: diabetes (ever had [yes/no]), heart attack (ever had [yes/no]), stroke (ever had [yes/no]), asthma (ever had [yes/no]), and hypertension (ever had [yes/no]).

Data Analysis

All analyses were conducted in SAS (Version 9.4). Specific SAS procedures and sampling design variables were used to account for the complex survey design of the 2019 NHIS dataset (PROC SURVEYFREQ, PROC SURVEYMEANS, PROC SURVEYREG, and PROC SURVEYLOGISTIC). Depression and no-depression groups were compared using *t*-tests for continuous variables and Pearson's χ^2 for categorical variables (Table 1). Anxiety and no-anxiety groups were compared using *t*-tests for continuous variables and Pearson's χ^2 for categorical variables (Table 2). The mental health issues ordinal scale was compared using ANOVA (*F*-statistic) for continuous variables and Pearson's χ^2 for categorical variables (Table 3). Multivariable logistic regression (for depression and anxiety, respectively) and multivariable ordinal regression (for mental health issues ordinal scale) were used to calculate the unadjusted and adjusted odds ratios for demographics and known comorbid conditions associated with a COPD diagnosis (Table 4).

Results

Presented in the following three sections are the descriptives for the overall sample for depression, anxiety, and mental health status and the relationship between the demographic variables and these three separate outcomes (Tables 1–3).

Descriptive Analysis

Descriptives by Depression Status

Table 1 shows the descriptives of U.S. adults by depression status. In 2019, 37.7% of adults with COPD reported having depression. Over two-fifths (43.7%) of women reported depression and were on average less than 60 years old. Over 5% (8.2%) of minorities reported having depression; 37.2 % of depressed participants were married, while a majority were either separated, divorced, or never married; and 30.5% were current or former smokers. Fifty percent of respondents with depression had an income of less than \$35,000 and were overweight. As can be seen in Table 1, there were significant associations between all demographics and depression, except when examining race/ethnicity ($p = 0.793$).

Table 1. Demographics For Adults With Chronic Obstructive Pulmonary Disease by Depression Status, 2019 National Health Interview Survey (N = 1,676)

Demographics	No depression n (weighted %)	Depression n (weighted %)	χ^2	<i>p</i> -value
Sex			49.35	<.001
Male	498 (49.9)	208 (32.5)		
Female	546 (50.1)	424 (67.5)		
Age (in years)	64.24 ^a (0.73 ^b)	59.78 ^a (0.75 ^b)	14.83 ^c	<.001
Race/ethnicity			3.92	.793
Non-Hispanic White	841 (77.4)	495 (75.3)		
Non-Hispanic Black	94 (9.2)	61 (9.3)		
Hispanic	68 (9.4)	42 (9.9)		
Asian	15 (1.7)	4 (1.6)		
American Indian/Alaskan Native	11 (0.9)	10 (1.2)		
Other	15 (1.5)	20 (2.8)		

Marital status			18.84	.003
Married	415 (47.5)	179 (37.2)		
Divorced, widowed or separated	467 (34.0)	336 (43.0)		
Never married	162 (18.6)	117 (19.8)		
Income level (5-point scale)	2.34 ^a (0.06 ^b)	1.92 ^a (0.07 ^b)	24.00 ^c	<.001
Body mass index (4-point scale)	3.06 ^a (0.03 ^b)	3.17 ^a (0.04 ^b)	4.45 ^c	.035
Cigarette smoking status			23.43	.001
Never smoked	239 (24.8)	121 (20.8)		
Former smoker	509 (45.8)	251 (38.3)		
Current smoker	296 (29.4)	260 (40.9)		

Note. The sample size is unweighted. ^aweighted mean; ^bweighted standard error; ^ct-statistic

Descriptives by Anxiety Status

Table 2 shows significant differences between all demographics and anxiety except for race/ethnicity ($p = 0.258$). Over 37% of adults with COPD reported anxiety. Over 20% (22.4%) of women have anxiety and were on average 59 years old. Over one-fourth (26.4%) of non-Hispanic Whites reported having anxiety; less than 10% (9.0%) of respondents with anxiety were currently married; and 26.8% were current or former smokers. Fifty percent of respondents with anxiety had an income of less than \$35,000 and were overweight.

Table 2. Demographics for Adults With Chronic Obstructive Pulmonary Disease by Anxiety Status, 2019 National Health Interview Survey (N = 1,676).

Demographics	No anxiety	Anxiety	χ^2	p-value
	n (weighted %)	n (weighted %)		
Sex			44.28	<.001
Male	533 (48.7)	173 (31.5)		
Female	594 (51.3)	376 (68.5)		
Age (in years)	64.20 ^a (0.70 ^b)	59.00 ^a (0.74 ^b)	19.43 ^c	<.001
Race/ethnicity			11.02	.258
Non-Hispanic White	894 (75.5)	442 (78.7)		
Non-Hispanic Black	105 (9.4)	50 (8.8)		
Hispanic	78 (10.5)	32 (7.6)		
Asian	16 (2.0)	3 (0.9)		
American Indian/Alaskan Native	15 (1.0)	6 (1.0)		
Other	19 (1.5)	16 (3.0)		
Marital status			17.66	.004
Married	443 (47.0)	151 (36.2)		
Divorced, widowed or separated	510 (35.0)	293 (42.7)		
Never married	174 (18.1)	105 (21.1)		
Income level (5-point scale)	2.34 ^a (0.06 ^b)	1.85 ^a (0.07 ^b)	34.57 ^c	<.001
Body mass index (4-point scale)	3.08 ^a (0.03 ^b)	3.17 ^a (0.04 ^b)	3.33 ^c	.068
Cigarette smoking status			21.73	.001
Never smoked	260 (25.8)	100 (17.9)		
Former smoker	530 (43.6)	230 (41.3)		
Current smoker	337 (30.6)	219 (40.7)		

Note. The sample size is unweighted. ^aweighted mean; ^bWeighted standard error; ^ct-statistic

Descriptives by Mental Health Issues Scale

As shown in Table 3, there were differences between all demographics and mental health issues scale except for race/ethnicity ($p = 0.881$). Almost 20% of adults with COPD had at least one mental health issue. Less than a third (29.8%) of women have one or two mental health issues and were on average between 57 to 64 years old. Over one-third (36.9%) of non-Hispanic Whites reported having at least one mental health issue, 13.3% of respondents with at least one mental health issue were currently married, and 36.5% were current or former smokers. Fifty percent of respondents with one or two mental health issues had an income between \$0-\$49,999 and were overweight.

Table 3. Demographics for Adults With Chronic Obstructive Pulmonary Disease by Mental Health Issues Status, 2019 National Health Interview Survey (N = 1,676).

Demographics	No mental health issues n (weighted %)	One mental health issue n (weighted %)	Two mental health issues n (weighted %)	χ^2	p-value
Sex				59.33	<.001
Male	451 (51.1)	129 (39.0)	126 (29.4)		
Female	470 (48.9)	200 (61.0)	300 (70.6)		
Age (in years)	64.31 ^a (0.77 ^b)	63.69 ^a (1.24 ^b)	57.83 ^a (0.79 ^b)	21.60 ^c	<.001
Race/ethnicity				8.42	.881
Non-Hispanic White	734 (76.4)	267 (76.6)	335 (77.0)		
Non-Hispanic Black	85 (9.4)	29 (8.5)	41 (9.3)		
Hispanic	62 (9.8)	22 (10.7)	26 (8.1)		
Asian	15 (1.9)	1 (1.7)	3 (1.1)		
American Indian/Alaskan Native	11 (1.0)	4 (0.7)	6 (1.2)		
Other	14 (1.4)	6 (1.8)	15 (3.3)		
Marital status				23.30	.007
Married	371 (48.2)	116 (41.9)	107 (34.8)		
Divorced, widowed or separated	410 (33.5)	157 (40.0)	236 (44.0)		
Never married	140 (18.3)	56 (18.1)	83 (21.3)		
Income level (5-point scale)	2.38 ^a (0.06 ^b)	2.11 ^a (0.11 ^b)	1.80 ^a (0.07 ^b)	38.47 ^c	<.001
Body mass index (4-point scale)	3.08 ^a (0.03 ^b)	3.00 ^a (0.06 ^b)	3.23 ^a (0.05 ^b)	4.93 ^c	.027
Cigarette smoking status				30.84	<.001
Never smoked	217 (25.2)	65 (26.2)	78 (17.0)		
Former smoker	444 (45.3)	151 (40.8)	165 (39.3)		
Current smoker	260 (29.5)	113 (33.0)	183 (43.7)		

Inferential Analysis

Table 4 presents the logistic regression for predicting depression, anxiety, and mental health issues of persons with a COPD diagnosis.

Table 4. Logistic Regression Models and Ordinal Regression Model of Adults With Chronic Obstructive Pulmonary Disease and Comorbid Conditions Predicting Depression, Anxiety, and Number of Mental Health Issues in 2019 National Health Interview Survey (N = 1,676)

	Unadjusted OR (95% CI)	Adjusted OR [†] (95% CI)
Depression		
Diabetes	2.10 (1.57, 2.80) ^{***}	2.03 (1.49, 2.77) ^{***}
Heart attack	1.30 (0.93, 1.82)	1.47 (1.04, 2.08) [*]
Stroke	1.65 (1.19, 2.31) ^{**}	1.58 (1.13, 2.20) ^{**}
Asthma	1.77 (1.39, 2.25) ^{***}	1.65 (1.28, 2.12) ^{***}
Hypertension	1.26 (0.97, 1.65)	1.18 (0.90, 1.55)
Anxiety		
Diabetes	1.85 (1.41, 2.42) ^{***}	1.74 (1.30, 2.34) ^{***}
Heart attack	1.47 (1.07, 2.04) ^{**}	1.62 (1.16, 2.27) ^{**}
Stroke	1.51 (1.08, 2.13) [*]	1.41 (1.01, 1.98) [*]
Asthma	2.30 (1.77, 2.99) ^{***}	2.22 (1.68, 2.92) ^{***}
Hypertension	1.47 (1.13, 1.91) ^{**}	1.37 (1.05, 1.79) [*]
Number of mental health issues		
Diabetes	2.02 (1.56, 2.61) ^{***}	1.93 (1.47, 2.53) ^{***}
Heart attack	1.41 (1.05, 1.90) [*]	1.58 (1.17, 2.14) ^{**}
Stroke	1.63 (1.21, 2.20) ^{**}	1.55 (1.15, 2.09) ^{**}
Asthma	2.03 (1.61, 2.56) ^{***}	1.94 (1.52, 2.47) ^{***}
Hypertension	1.34 (1.05, 1.70) [*]	1.23 (0.96, 1.57)

Note. ^{*} $p < 0.05$. ^{**} $p < 0.01$. ^{***} $p < 0.001$. OR = odds ratio; CI = confidence interval

[†]After controlling for sex, race/ethnicity, marital status, income, body mass index, and cigarette smoking status.

Depression

Table 4 shows that after adjusting for demographics, adults with COPD who had had diabetes were 103% more likely to report depression than those who had never had diabetes (adjusted odds ratio [aOR]: 2.03; 95% confidence interval (CI): 1.49, 2.77). Those with COPD who had had a heart attack were 47% more likely to report depression than those who had never had a heart attack (aOR: 1.47; 95% CI: 1.04, 2.08). The prevalence of depression was 58% higher among adults living with COPD who had had a stroke than those who had not (aOR: 1.58; 95% CI: 1.13, 2.20). Adults classified as having COPD who had suffered from asthma were 65% more likely to have reported symptoms of depression than those who had not suffered from asthma (aOR: 1.65; 95% CI: 1.28, 2.12). There was no statistically significant association between hypertension and depression for adults living with COPD (aOR: 1.18; 95% CI: 0.90, 1.55).

Anxiety

Table 4 shows that after adjusting for demographic factors, persons with COPD who had a history of diabetes were shown to have a 74% higher incidence of reported anxiety than those who had never been diagnosed with diabetes (aOR: 1.74; 95% CI: 1.30, 2.34). Adults with COPD who had had a heart attack were 62% more likely to have reported experiencing anxiety than those who had never suffered a heart attack (aOR: 1.62; 95% CI: 1.16, 2.27). Adults with COPD who had experienced a stroke were 41% more likely to have reported anxiety than those who had not had a stroke (aOR: 1.41; 95% CI: 1.01, 1.98). Adults with COPD who had had asthma were 122% more likely to have reported anxiety than those who had never had asthma (aOR: 2.22; 95% CI: 1.68, 2.92). Adults with COPD who had reported hypertension were more likely to have reported anxiety than those who had never had hypertension (aOR: 1.37; 95% CI: 1.05, 1.79).

Number of Mental Health Issues

Table 4 shows that adults with COPD were 93% more likely to report diabetes than those with no reported diabetes for each number of mental health issues (aOR: 1.93; 95% CI: 1.47, 2.53). Adults with COPD were 58% more likely to report a heart attack than no reported heart attack for each number of mental health issues (aOR: 1.58; 95% CI: 1.17, 2.14). Adults with COPD were 55% more likely to have a stroke compared to no stroke for each number of mental health issues (aOR: 1.55; 95% CI: 1.15, 2.09). Adults with COPD were 94% more likely to have asthma compared to no asthma for each number of mental health issues (aOR: 1.94; 95% CI: 1.52, 2.47). There was no significant difference between adults with COPD who had hypertension and those who did not have hypertension in terms of the prevalence of mental health issues (aOR: 1.23, 95% CI: 0.96, 1.57).

Discussion

This current study aimed to examine the relationship between COPD comorbidities, depressive symptoms, and anxiety in a nationally representative sample of people who reported having a COPD diagnosis, considering potential confounding factors. More than a third of the people who reported COPD suffer from depression or anxiety, and the prevalence of these mental health concerns was comparable in terms of their severity. Many studies have shown that people with COPD experience high rates of depression and anxiety (Barrueco-Otero et al., 2022; Bugajski et al., 2023; Li et al., 2020; Liu, 2023; Rahi et al., 2023). In the current study, 45.0% of participants reported suffering from depression or anxiety, indicating that people living with COPD do, indeed, experience mental health issues (Barrueco-Otero et al., 2022; Bugajski et al., 2023; Li et al., 2020; Liu, 2023; Rahi et al., 2023).

The findings in the present study support the work of Holmes et al. (2020), who found that persons living with COPD who suffer from anxiety and/or depression experience worsening COPD symptoms, which can lead to feelings of physical and social isolation, excessive worry, loss of social support, and fear of self-isolation. These findings are in line with those of de la Cruz and Cebrino (2021) for patients suffering from several chronic conditions. Aside from hypertension, the present study indicated that COPD influences anxiety and depression and increases the prevalence of specific comorbidities (such as diabetes, heart disease, stroke, and asthma) in U.S. adults. Because of its chronic nature, differentiated symptoms, and frequent exacerbations, the underlying COPD disease has a substantial impact on patients' quality of life. Research conducted by Hurst et al. (2020) provides evidence that this impact is real. Kupcewicz and Abramowicz (2014) showed that the amount of depression was negatively correlated with the length of time COPD sickness was present. According to MacLeod et al. (2021), more individuals are affected negatively by COPD when they have it for a longer duration.

The most prominent symptom of COPD is shortness of breath, and its severity gradually worsens as the disease becomes worse. When mental health diagnoses are combined with respiratory disease, the symptoms of the respiratory disease, particularly wheezing and shortness of breath, are subjectively made worse, (Bugajski et al., 2023; Liu, 2023; Rahi et al., 2023). It is also important to consider the level of health information (HI) possessed by patients and their level of engagement in their treatment and cooperation with their primary care providers. Research shows that depression and anxiety have a major impact on functional issues in all aspects of quality of life: They are associated with lengthy hospital stays and more frequent hospitalizations due to exacerbations of underlying conditions (Cerezo Lajas et al., 2018). Many scholars (Bugajski et al., 2023; Li et al., 2020; Liu, 2023; Rahi et al., 2023) highlight the role of other factors associated with the severity of depression and anxiety symptoms and disease exacerbations that require hospital admissions. These factors align with the findings here that the progression of COPD can and often does lead to worse comorbidities.

According to the findings of the present study and previous research (Bugajski et al., 2023; Li et al., 2020; Liu, 2023; Rahi et al., 2023), the severity of comorbidities is only worsened by depression and anxiety. In tandem with the progression of COPD, social factors also contribute to such issues (Liu, 2023; Pakhale et al., 2022; Yohannes, 2021). The present study is similar to one that was conducted by Lee et al. (2018), which found an association between COPD and the level of depression patients experienced. This association between the severity of COPD and the degree of depressive symptoms has been confirmed by several other authors as well (Li et al., 2020; Strollo et al., 2021). In addition, the duration of the disease, the number of cigarettes smoked, and the number of packs of cigarettes smoked each day were found to have a negative impact on the severity of depressive symptoms in our research.

According to several experts, low socioeconomic position is a significant factor in the development of depressive symptoms and poor mood, and this factor may be causal (Lee et al., 2018; Rahi et al., 2023). Both the results of our study and those found in other research imply that accurate identification of patients' moods is an essential component of effective treatment for COPD. Antidepressants and benzodiazepines are prescribed to only 27–45% of persons who suffer from depression and anxiety (Barrueco-Otero et al., 2022; Bushnell et al., 2021; Liu, 2023; Rahi et al., 2023; Tsao et al., 2022). Early diagnosis of depression and anxiety enables the introduction of management strategies that limit their negative effects to promote effective treatment of the disorder and underlying COPD diagnosis, a reduction in hospitalizations, and an increase in the patient's conscious participation in the therapeutic process. There is some research that describes the major influence of self-care on reducing the amount of time spent in the hospital and the number of COPD exacerbations (Bugajski et al., 2023; Z. Chen et al., 2017; Liu, 2023; Rahi et al., 2023; Syakura et al., 2020).

The present research investigated participants' social networks by considering their marital status. The results showed that marital status was associated with depression, anxiety, and the total number of mental health issues ($p < 0.01$; Tables 1–3). Because of this, it was considered a covariate. Several studies have employed many indicators (such as social networks, trust, and community presence) to capture the full scope of social capital in COPD patients (Gu et al., 2021; Welch et al., 2020). Higher levels of social capital are associated with better mental health outcomes or lower rates of depression and anxiety (Barrueco-Otero et al., 2022; Bugajski et al., 2023; Han et al., 2020; Lebenbaum et al., 2021; Rahi et al., 2023; Sun & Lu, 2020). These findings highlight the importance of examining social networks and support systems for helping COPD patients manage their mental and psychological well-being.

Implications for Practice

Based on the findings of the present research, medical professionals need to explain to their patients that COPD is a term that encompasses the diagnoses of emphysema and chronic bronchitis (CDC, 2022, 2021; Chow et al., 2023; Ward et al., 2017). In order to accomplish this, providers should give COPD patients sufficient medical HI at the time of their diagnosis, including the impact of any comorbidities that have been recognized in the literature (Chow et al., 2023; Nam et al., 2022; Poureslami et al., 2022). Lowering the likelihood of COPD-related exacerbations and hospital readmissions may also improve health outcomes. In addition, purposeful and targeted communication techniques can encourage a patient to exercise self-management and improve health outcomes (Smith et al., 2013). Furthermore, Smith et al. (2013) and X. Chen et al. (2018) indicate that HI should be adapted to each patient's health literacy level (Azkan Ture et al., 2022; Poureslami et al., 2022; Syakura et al., 2020). It has been demonstrated that inequalities in access to healthcare can lead to a decreased utilization of preventive services, a lack of knowledge regarding the management of chronic diseases such as COPD and other comorbidities, an increase in the rate of hospitalization, and a lower self-reported overall health status (Mihaltan et al., 2019; Poureslami et al., 2022;).

There are several reasons why it is critical to consider the social networks of COPD patients. A key component of COPD self-management is social support. Patients who have supportive social networks are more likely to

take their medication as prescribed, keep to their healthy lifestyle habits, and manage their disease effectively (Laranjo et al., 2015; Nyman, 2023; Welch et al., 2020). One way healthcare providers can prevent loneliness and promote general well-being is by linking patients with their social networks. Making patients spend more time with their friends and family can help keep costs down (Bagnasco et al., 2021; Sigurgeirsdottir et al., 2020). Both patients and healthcare practitioners can benefit from social network interventions. These interventions can extend existing COPD support networks that maintain supportive relationships for a healthy mental and emotional state (Shalaby & Agyapong, 2020; Welch et al., 2020). Healthcare providers can also improve their patients' emotional and psychological well-being by making use of social media.

Limitations

Because the survey data were self-reported, data were subject to error and reporting bias. Participants might not have been forthcoming about their health behaviors, such as smoking and alcohol consumption, because of their doctors' recommendations to refrain from or reduce those health behaviors associated with COPD, thus producing prevarication bias. Additionally, the survey asked individuals to recall information from over 12 months ago. Participants may have inadvertently omitted information in the survey because of the lapse of time between the survey and their diagnosis, thus producing recall bias. Moreover, the data of NHIS is not based on a medical diagnosis via laboratory findings or a patient's medical file but relies on participants' self-reporting.

Future Research

To reduce the possibility of bias in future studies, researchers should review each patient's medical and laboratory records. Patients should be eligible to participate only if they have reported a COPD diagnosis within the past six months. This will help minimize the chances of patients unintentionally leaving out vital information. Furthermore, individuals with Alzheimer's disease or dementia should not be eligible to participate due to the potential bias in their diagnosis information caused by their impaired memory.

Patients with COPD might benefit from HI and HI messaging, which could be the subject of future studies. Most HI is written at a level above the recommended sixth grade (Azkan Ture et al., 2022; Chow et al., 2023; Gray et al., 2019; Kim & Xie, 2017; Poureslami et al., 2022). Therefore, studies such as this could assess the effectiveness of HI presented in text format. Participants' understanding of their COPD diagnosis, comorbidities, exacerbation risk, hospitalization, and rehospitalization due to COPD, as well as treatment variations among COPD, emphysema, chronic bronchitis, and comorbidities will be an important focus of future research. Furthermore, the only way to find out if social capital affects life expectancy is to look at COPD status. Researchers have proposed looking at people's stories through interviews to learn more about COPD and how comorbidities affect their physical and mental health. Supportive connections with family and friends, involvement in social organizations or activities, and use of community services are all areas that would benefit from more research regarding how people living with COPD manage their daily lives.

Conclusion

The findings of the present study indicate that having COPD and a mental health issue puts U.S. adults at a greater risk for associated comorbidities. Recognizing and coming to terms with a COPD diagnosis can impact most significantly the degree of depression or anxiety experienced by adults living with COPD. Acknowledging or recognizing having depression, anxiety, or both psychiatric conditions has been shown to have a substantial association with the severity of COPD. In addition to coming to terms with one's condition, people with COPD should also consider factors such as smoking, income, and body mass index, as all have a key role in the development of mental health symptoms and are related to comorbidities. Only by tackling these issues can persons with COPD receive better treatment, reduce hospitalization and rehospitalization, and live longer and healthier lives.

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