Chapter 7
Anxiety, Depression, and Using Evidence-Based Techniques and Strategies to Support Engagement and Adherence

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Introduction

Psychological symptoms are common in patients with chronic respiratory disease, as the prevalence of anxiety and depression is higher in these patients than in the general population [83]. The heightened experience of dyspnea is thought to be a contributing factor to anxiety in these patients, while feelings of depression may be precipitated by restriction in daily activities and subsequent disability caused by the disease. Anxiety and depression symptoms are often comorbid. Importantly, the presence of anxiety and/or depression alongside pulmonary disease is associated with poorer outcomes for these patients, including decreased HRQoL and functional status, increased mortality, longer hospital stays, and higher exacerbation rates [47]. Many of these unfavorable outcomes are related to lower treatment adherence and engagement seen in anxious and depressed patients with chronic medical conditions [26]. Furthermore, the impact of psychological symptoms is not limited to an individual's pulmonary disease, as depression and anxiety can negatively affect a person's interpersonal relationships, inadvertently reducing social support.

Despite the negative influence of anxiety and depression on outcomes for this population, the psychological consequences of pulmonary disease are often insufficiently addressed, at least in the pulmonary medicine community [68]. One reason for this may be that there is significant overlap between the somatic symptoms of

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anxiety and depression and the symptoms of respiratory disease (e.g., dyspnea, fatigue), often leading healthcare professionals to attribute a patient's symptoms only to the physiological mechanisms of the disease. Even if mental health concerns are suspected, respiratory healthcare professionals often report feeling poorly equipped to handle mental health concerns when they present. The purpose of this chapter is to raise awareness among healthcare professionals regarding the secondary psychological difficulties associated with respiratory disease and how these issues can impact patient engagement, adherence, and health behavior change. We aim to provide practical recommendations on how to address these issues within the scope of one's practice. The benefits of having a mental health professional on one's team or at least a partnership with one will also be discussed.

Anxiety and Pulmonary Disease

Anxiety in Patients with Pulmonary Disease

Anxiety symptoms occur at a higher rate among patients with pulmonary diseases compared to the general population [16, 64, 69, 90, 106, 107]. Evidence suggests that among patients with chronic obstructive pulmonary disease (COPD), a disease characterized by permanent pulmonary obstruction and airway inflammation, 13%–50% of patients report moderate-to-severe levels of anxiety [30, 56, 69, 103], with some estimates as high as 74% [106]. These prevalence rates are paralleled among patients with other pulmonary diseases, such as pulmonary hypertension and lung cancer [17, 42, 62, 64].

Similarly, there are high prevalence rates of patients with pulmonary diseases meeting full criteria for psychiatric anxiety disorders. Recent estimates have indicated that 10%–24% of pulmonary patients have a comorbid anxiety disorder, with panic disorder and generalized anxiety disorder (GAD) being the most prominent [16, 69]. Specifically, panic disorder and GAD are estimated to occur in pulmonary patients at a rate that is three times higher than the general US population [64, 69].

Panic disorder is characterized by the presence of recurrent and unexpected panic attacks which typically peak within several minutes and are associated with intense fear or discomfort (see Table 7.1 for detailed symptoms; [3]). Due to these intense fears and accompanying physiological sensations, a panic attack is often mistaken by patients as a heart attack [18]. Approximately 30–75% of patients who present to the emergency room with chest pain complaints are believed to have experienced a panic attack rather than a true cardiac event [10, 21, 33, 52]. Individuals with panic disorder experience recurrent panic attacks and often demonstrate a higher rate of medical services utilization and rehospitalization [21, 108].

Panic attacks are especially prominent in patients with pulmonary disease, as many symptoms associated with these medical conditions (i.e., dyspnea, hyperventilation, chest tightness, and diaphoresis) increase the risk of eliciting a panic attack [16, 64, 69]. Pulmonary patients with comorbid panic disorder experience recurrent panic attacks and subsequently may begin to demonstrate changes in their behavior in an attempt to avoid a future panic attack [3]. This can lead to avoidance of

Table 7.1 Diagnostic criteria for panic disorder and generalized anxiety disorder (GAD)

Panic disorder	Generalized anxiety disorder (GAD)
Recurrent panic attacks reach a peak within minutes and include *at least four* of the following: Palpitation/accelerated heart rate Sweating Shaking Shortness of breath Feelings of choking Chest pain/discomfort Nausea/abdominal distress Feeling dizzy, light-headed, or faint Chills/heat sensations Paresthesia Derealization or depersonalization Fear of losing control Fear of dying	Excess anxiety or worry has been present more days than not *at least the past six months* and associated with *at least three* of the following: Restlessness or feeling on edge Easily fatigued Difficulty concentrating Irritability Muscle tension Sleep disturbance
At least one panic attack has been followed by *at least 1 month* of one or both of the following: Persistent worry about additional panic attacks or consequences of the attacks (i.e., worsening medical condition) Maladaptive behavior related to the attacks (e.g., avoidance of exercise to avoid having panic attacks)	The patient must also exhibit the following conditions: Excessive worry about a number of events (e.g., work, relationships, heath) Difficulty controlling the worry Worry causes significant distress in important areas of functioning (i.e., occupation and social)
Symptoms not attributable to effects of a substance, medication, other medical condition, or better explained by another mental disorder.	Symptoms not attributable to effects of a substance, medication, other medical condition, or better explained by another mental disorder.

behaviors that are necessary to improve their overall health, such as engagement in physical activities, interpersonal interactions, or exercise training [25, 69, 87].

Similarly, GAD is characterized by a 6-month period or longer of excessive anxiety that is extremely difficult to control and encompasses numerous aspects of daily functioning (see Table 7.1 for detailed symptoms; [3]). In order for GAD to be diagnosed, the anxiety must be above and beyond worry that would be expected in the context of sociocultural influences. Additionally, in order to meet full criteria for GAD, the individual must feel unable to control their worry, thereby causing significant distress and impairment in their daily functioning [3]. Ultimately, pulmonary patients with typical anxious reactions to their medical condition (e.g., a recent lung cancer diagnosis) who have demonstrated a reasonable ability to cope with these concerns without exhibiting significant dysfunction would not be concerning for a diagnosis of GAD.

Additionally, when encountering patients in acute care settings, the presence of an adjustment disorder may be especially prominent, as these patients are learning to adjust to changes in their physical functioning. An adjustment disorder is characterized by an emotional or behavioral disturbance that occurs within 3 months following the onset of a clearly identifiable stressor (e.g., onset of a pulmonary condition) [3]. These emotional or behavioral changes must be considered markedly out of proportion to the severity of the stressor and/or cause significant impairment

in aspects of daily functioning (i.e., social or occupational environment) [3]. Adjustment disorders can further be specified as presenting with anxiety symptoms or with a combination of anxiety and depressive symptoms. The ability to correctly identify an adjustment disorder will help the patients connect with appropriate psychological interventions to improve coping skills and reduce distress. Without proper treatment, the anxiety symptoms resulting from the patient's inability to effectively adjust to their new physical functioning may lead to limited engagement in physical activity, improper use of oxygen or NIV masks/nasal pillows, and ineffective medication adherence [23, 94].

Psychometrically Sound Screening Measures for Anxiety

Despite the high rate of problematic anxiety among patients with pulmonary disease, in the past, it has been rarely assessed or addressed across various medical settings [65]. Therefore, numerous screening measures have been developed and empirically validated to help professionals quickly identify anxiety symptoms among patients. A selection of the most commonly used and psychometrically sound brief screening measures has been presented in Table 7.2. Each of these screening measures is completed by patient self-report and provides outcomes related to severity of anxiety or specific anxiety disorders.

Generalized Anxiety Disorder-7 Item (GAD-7)

The GAD-7 was developed as a clinical screening tool for the diagnosis and severity of GAD symptoms within a clinical practice [92]. Since its development, the GAD-7 has been validated in medical care settings, including primary care and inpatient psychiatric care [55, 58, 95]. The first two items ("feeling nervous, anxious, or on edge" and "not being able to stop or control the worry") of the GAD-7 assess core anxiety symptoms [92]. The remaining five items relate to cognitive, affective, and behavioral correlates of anxiety.

The GAD-7 demonstrates robust psychometric properties in its ability to detect anxiety symptoms and various anxiety disorders (i.e., GAD, panic disorder, social anxiety, and posttraumatic stress disorder) in primary care settings among adult and elderly populations [58, 95]. Studies have also demonstrated that administering only the first two items on this measure (commonly referred to as the GAD-2) provides similar detectability standards as the full GAD-7 [58]. Therefore, depending on the time restrictions within specific medical care settings, the GAD-2 may be beneficial as a brief screener for anxiety disorders, with the GAD-7 implemented as a follow-up measure to assess the severity of anxiety symptoms as indicated [58]. Overall, it is recommended that the GAD-7 be used within a primary care or inpatient hospital setting when time is limited and healthcare professionals would like to obtain a quick assessment if possible anxiety issues are present and if referral to professional services is required.

Table 7.2 Description of screening measures for anxiety

Screening tool	Items	Completion time	Measures	Rating scale	Pros/cons
Generalized Anxiety Disorder-7 (GAD-7) item	7	1–3 min	Anxiety	(0–4) Normal (5–9) Mild (10–14) Moderate (15–21) Severe	Pro: Very quick, self-report administration. Good for primary care and inpatient settings. Open access available. Cons: Only provides a brief assessment of anxiety and does not capture symptoms specific to other disorders (i.e., panic disorder, posttraumatic stress disorder)
Hospital Anxiety and Depression Scale (HADS)	14	2–5 min	Anxiety Depression	(0–7) Normal (8–10) Borderline abnormal (11–21) Abnormal	Pro: Combined depression and anxiety measure. Strong use among pulmonary patients. Con: Item 4 may inaccurately conceptualize decreased physical functioning from the pulmonary disease as a depressive symptom.
Beck Anxiety Inventory (BAI)	21	5–10 min	Anxiety with a focus on somatic symptoms	(0–9) No anxiety (10–18) Mild-to-moderate anxiety (19–29) Moderate-to-severe anxiety (30–63) Severe anxiety	Pro: Widely recognized across healthcare settings. A brief version specific for primary care is also available (BAI-PC). Con: Items primarily focus on the physical symptoms rather than the cognitive symptoms of anxiety.
Psychosocial Risk Factor Survey (PRFS)	70	10–15 min	Depression Anxiety Anger/Hostility Social Isolation Guardedness	(30–54) Normal (55–59) Mild (60–65) Moderate (66–80) Severe	Pro: Provides detailed descriptions of the patient's overall presenting problems. Specifically developed for pulmonary patients. Con: Requires longer administration duration.

Hospital Anxiety and Depression Scale (HADS)

The HADS comprises two subscales for measuring anxiety (HADS-A) and depression (HADS-D) [109]. This measure has been validated in somatic, psychiatric, and primary care patients, as well as the general population [12]. Overall, the HADS had demonstrated good reliability in determining the presence of anxiety and depression among adult and elderly patients [12, 27, 43]. However, it should be noted that item 8 of the HADS ("I feel as if I have slowed down") is not considered an accurate representation of depressive symptomology when administered among patients aged 65–80 [27, 43].

Among pulmonary patients, the HADS has been well validated among patients with mild-to-severe COPD [81, 89]. When examining the specific subscales, the HADS-D was shown to have improved detection sensitivity with the removal of item 4 ("I feel as if I am slowed down"), whereas the HADS-A subscale was shown to have good sensitivity without any modifications [81]. Overall, it is recommended that the HADS measure be administered to patients with pulmonary disease when there is a concern of both depression and anxiety problems.

Beck Anxiety Inventory (BAI)

Perhaps the most universally recognized and utilized measure of anxiety, the BAI [6] measures the severity of anxiety symptoms with a particular focus on the somatic presentation of anxiety (e.g., feeling of choking, dizziness, and increased heart rate), which has been shown to negatively impact adherence and engagement with pulmonary therapies, such as the use of inhalers, oxygen therapy, smoking cessation, and physical activity [23, 34, 93, 94]. The BAI is well validated among pulmonary patients and demonstrates robust sensitivity for detection of anxiety symptoms among this population [81]. As medical care settings often necessitate time-efficient measures for patients, a shorter BAI was developed specifically for use in primary care settings. This BAI-PC is composed of seven items derived from the measure's original 21 items and uses a clinical cutoff score of 5 to determine the presence of an anxiety disorder [7]. The BAI-PC has been shown to be highly effective in screening for panic disorder and GAD among primary care patients [7] and serves as an alternative for professionals in various medical settings. Given the strong negative effects of somatic anxiety symptoms on pulmonary therapy, it is recommended that this measure be administered when a patient's limited engagement in pulmonary treatment (e.g., exercise and oxygen therapy) may be better explained by the presence of an anxiety disorder.

Psychosocial Risk Factor Survey (PRFS)

Although the PRFS is the longest of the selected screening measures, it also provides a more comprehensive assessment of psychological factors in patients with pulmonary disease, including depression, anxiety, anger/hostility, social isolation, and emotional guardedness [28]. The PRFS was specifically developed to assess these important psychological distress components among pulmonary and cardiac patients [28]. This scale

is validated for patients in cardiac rehabilitation programs and would likely be as useful in pulmonary rehabilitation patients. It is recommended that this measure be administered to patients engaged in pulmonary or cardiac rehabilitation programs, as it was specifically designed for this population and requires additional time to complete that may not be available within an inpatient setting.

Impact on Engagement, Adherence, and Outcomes

Anxiety can negatively impact a breadth of outcomes among pulmonary patients, including avoidance of specific behaviors, decreased adherence to treatment regimen, increased risk for rehospitalization, and poor HRQoL [19, 48, 56, 87, 106]. Given the prevalence of anxiety among patients with pulmonary disease, it is necessary to understand the multifaceted impact of anxiety across various health-related outcomes.

Dyspnea–Fear Cycle

There is strong evidence establishing a connection between the respiratory symptom of dyspnea and anxiety or dyspnea-related fear [5, 25, 48, 69, 72]. Psychological theories posit that anxiety often occurs when a patient experiences dyspnea and misinterprets it as a life-threatening event. This misinterpretation may lead to a heightened panic response, and subsequently exacerbates physiological arousal (i.e., increased heart rate, hyperventilation, and sweating), which leads to strengthened or additional dysfunctional cognitive reinterpretations of the physical symptoms [5, 16, 48].

In this model, the patient continually cycles between experiencing dyspnea, fear/anxiety and worsening dyspnea, and physiological symptoms (see Fig. 7.1). Over time, this dyspnea–fear cycle can lead to recurrent panic attacks [64], overall increased anxiety [16, 69], and decreased HRQoL [48]. Often in an attempt to avoid recurrent panic attacks and reduce anxiety, patients may begin to avoid any activity that induces dyspnea [87]. This is particularly harmful among pulmonary patients, as this cycle can lead to decreased exercise training and engagement in activities of daily living [25, 75, 87]. Ultimately, this inactivity due to dyspnea-related fear may produce negative effects on lung-functioning capabilities and overall HRQoL [25, 48], leading to deconditioning. However, it has been shown that adherence to exercise training can reduce anxiety and avoidance behaviors [19, 48] as well as other health-related outcomes, including hospitalization, respiratory mortality, and acute exacerbations [70, 71, 98] (see Chap. 8).

Healthcare Utilization

In addition to the association between anxiety and dyspnea, there is also a strong connection between anxiety and rehospitalizations that is likely related to the fear–dyspnea cycle [40, 56]. Patients with pulmonary disease and anxiety utilize healthcare services, including general practitioner and emergency treatment services, at a

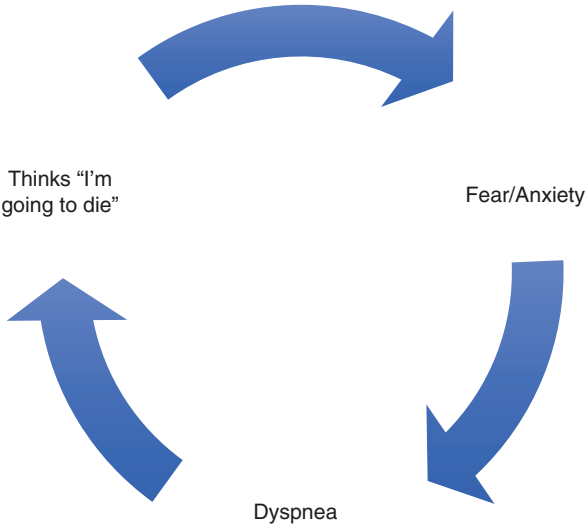

Fig. 7.1 Dyspnea–fear cycle

higher rate compared to patients with pulmonary disease without anxiety [56]. Additionally, patients with obstructive pulmonary diseases are at higher risk for rehospitalization, which may occur as soon as 1 month after discharge [24, 40]. Therefore, identifying anxiety symptoms and directly implementing appropriate psychological intervention, such as cognitive–behavioral therapy (CBT), may reduce rehospitalization rates and overall healthcare utilization.

Functional Impairment

Anxiety symptoms can further impede rehabilitation treatment, resulting in impaired functional capabilities [56, 106], increased risk of mortality [69], and reduced HRQoL beyond that expected by the disease alone [1, 42, 48]. Several studies have shown that anxiety has a greater negative impact on the patient's functional status than expected with the disease alone, even surpassing lung-functioning capabilities [35, 104] and disease severity [56]. When patients inaccurately view themselves as severely impaired, they are less likely to fully engage in physical activity, social functioning, or daily living activities [56, 77]. Additionally, this skewed negative perception increases hospital admissions and acute exacerbations [40, 60].

Depression and Pulmonary Disease

Depression in Patients with Pulmonary Disease

Similar to anxiety, depressive symptoms can also present in individuals with pulmonary conditions and can impact the course and treatment of their disease. The most common form of depression is major depressive disorder (MDD), which is

Table 7.3 Diagnostic criteria for major depressive disorder (MDD) and adjustment disorder

Major depressive disorder (MDD)	Adjustment disorder
Five or more of the following symptoms have been present during a 2-week period and *at least one* of the symptoms is either (1) depressed mood or (2) loss of interest or pleasure: Depressed mood most of the day, nearly every day Diminished interest or pleasure in almost all activities most of the day, nearly every day Decrease or increase in appetite nearly every day or significant weight change (more than 5% of body weight in a month) Insomnia or hypersomnia nearly every day Psychomotor retardation or agitation Fatigue or loss of energy nearly every day Feelings of worthlessness or excessive guilt Difficulty concentrating or indecisiveness Recurrent thoughts of death, suicidal ideation, specific plan for completing suicide, or a suicide attempt	Development of emotional or behavioral symptoms in response to an identifiable stressor *within 3 months* of the onset of said stressor Symptoms or behaviors are clinically significant and include *one or both* of the following: Marked distress that is considered out of proportion to the severity of the stressor Significant impairment in multiple areas of functioning (e.g., social, occupational)
Symptoms cause clinically significant distress or impairment in multiple areas of functioning (e.g., social, occupational)	Symptoms do not meet criteria for another mental disorder nor are considered an exacerbation of a preexisting mental disorder
Symptoms not attributable to effects of a substance, medication, or other medical condition or better explained by another mental disorder	Symptoms do not represent normal bereavement
Patient has never experienced a manic or hypomanic episode	Once the stressor is removed, the symptoms do not persist for more than 6 months

characterized by markedly depressed mood, loss of interest and pleasure in activities, and a variety of related symptoms, such as sleep or appetite disturbances, fatigue, and feelings of worthlessness (see Table 7.3 for detailed symptoms; [3]). Adjustment disorder with features of depression is also a common diagnosis for individuals who have recently discovered that they are suffering from a chronic medical condition. These individuals do not meet full criteria for MDD, but show significant distress in reaction to receiving their medical diagnosis (see Table 7.3 for detailed symptoms; [3]). Depressive symptoms can be assessed quickly with screening assessments. Determining whether a patient is suffering from depression and directing them to an appropriate treatment option is important, as this type of disorder can influence engagement, adherence, and outcomes of pulmonary care.

Prevalence

The reported prevalence of depression in patients with pulmonary disease varies based on the specific respiratory disease. A recent meta-analysis found a mean depression prevalence of 27.1% among COPD patients across 19 research studies,

with estimates ranging from 15.2% to 35.7% [67]. Estimates of depression in patients with interstitial lung disease are somewhat similar to COPD and range from 10% to 49% [20]. Heterogeneity across the studies included in each of these reviews was high, which may have contributed to the variability of prevalence estimates [20, 67]. This underscores the need for future standardized research studies in order to establish increasingly accurate estimates. Smaller scale studies examining mental health comorbidities in patients with bronchiectasis have found that approximately 20% of these patients experience depression [73, 76]. The presence of depression symptoms in patients with pulmonary conditions is often underdetected, which is why understanding of depressive symptomatology in pulmonary settings is imperative in order to improve patient care [59].

Depressive Symptoms

Patients may present with a variety of symptoms that could signify depression. The hallmark symptoms are persistent depressed mood and loss of interest or pleasure in activities previously enjoyed. Depressed mood can be described as sadness, hopelessness, or an absence of experiencing feelings. Anhedonia (lack of pleasure) or losing interest in activities can manifest in various forms. For example, an individual with depression may not engage in previously enjoyed hobbies, withdraw socially, or experience a decrease in sexual desire [3].

In addition to these primary symptoms of depression, patients may experience several other accompanying features of this disorder, such as sleep disturbance, manifested as difficulty falling asleep, waking prematurely, or sleeping excessively. Fatigue, even after expending minimal energy, is also frequently reported. Patients experiencing depression might move, think, and speak slower than normal. The opposite can also occur such that a person with depression may have difficulty sitting still and displays fidgeting behaviors. Appetite changes are also common and can present as eating either less or more than normal. Significant weight loss or gain can accompany these changes in appetite. Some patients mention difficulties with concentrating, memory, or making routine decisions. Depressed patients can have excessively negative evaluations of their self-worth or disproportionate feelings of guilt related to seemingly trivial past events. Lastly, thoughts of death, suicidal ideation, or suicide attempts can be indicative of depression. These may be passive thoughts about death, recurrent thoughts of completing suicide, or thoughts about specific plans for ending one's life [3].

Importantly, depressive-like symptoms can occur in some patients as a reaction to being diagnosed with a pulmonary condition even though they may not meet full diagnostic criteria for major depressive disorder (MDD). If patients show marked distress and reduction in mood after receiving a diagnosis, but do not exhibit the aforementioned symptoms consistent with MDD, they may be experiencing an adjustment disorder with features of depressed mood [3]. While a psychiatric diagnosis needs to be determined by a licensed mental health professional, being aware of depressive symptomatology as a medical professional can help facilitate the

identification of patients who could especially benefit from a potential referral for treatment. Ideally, all patients with pulmonary disease should be screened for depressive symptoms given increased risk compared to the general population.

Psychometrically Sound Screening Measures for Depression

Brief screening assessments for depression can be administered to patients with pulmonary conditions. Table 7.4 describes the properties of four depression screeners that have demonstrated good psychometric properties, such as adequate validity and reliability [9, 28, 57, 109]. These screening tools are quick to administer and score and can assist in determining whether a patient might benefit from further psychological evaluation and/or mental health intervention.

Table 7.4 Description of screening measures for depression

Screening tool	Items	Completion time	Measures	Rating scale	Pros/cons
Physician Health Questionnaire (PHQ-9)	9	3–5 min	Depression (presence and severity)	(0–4) None (5–9) Mild (10–14) Moderate (15–19) Moderate/severe (20–27) Severe	Pros: Quick, self-reported administration. Good for primary care and inpatient settings. Open access available. Con: Can result in false positives for depression and should be used for screening rather than diagnosis.
Hospital Anxiety and Depression Scale (HADS)	14	4–5 min	Anxiety (HADS-A) Depression (HADS-D)	(0–7) Normal (8–10) Borderline (11–21) Abnormal	Pro: Combined depression and anxiety measure. Strong use among pulmonary patients. Con: Item 4 may inaccurately conceptualize decreased physical functioning from the pulmonary disease as a depressive symptom.

(continued)

Table 7.4 (continued)

Screening tool	Items	Completion time	Measures	Rating scale	Pros/cons
Beck Depression Inventory (BDI-II)	21	5 min	Depression (presence and severity)	(0–13) Minimal (14–19) Mild (20–28) Moderate (29–63) Severe	Pros: Brief and widely recognized across healthcare settings. Cons: Wordings of certain questions are culturally specific. Some items focus on physical symptoms that may result in false positives for pulmonary patients.
Psychosocial Risk Factor Survey (PRFS)	70	10–15 min	Depression Anxiety Anger/Hostility Social Isolation Guardedness	(30–54) Normal (55–59) Mild (60–65) Moderate (66–80) Severe	Pro: Provides detailed descriptions of the patient's overall presenting problems. Specifically developed for pulmonary patients. Con: Requires longer administration duration.

Patient Health Questionnaire (PHQ-9)

The PHQ-9 is a nine-item self-report scale with scores that indicate depression severity as well as proposed treatment actions, such as creating a treatment plan, referring for psychological counseling, or considering the addition of psychotropic medications. Reliability among primary care patients, including those with pulmonary conditions, demonstrated a Cronbach's alpha of 0.89. Compared to mental health professional depression diagnoses, sensitivity and specificity both equaled 88% [57].

Hospital Anxiety and Depression Scale (HADS)

The HADS is a 14-item self-report scale intended to distinguish between anxiety and depression in medical patients. It is comprised of two subscales measuring anxiety (HADS-A) and depression (HADS-D) [109]. This measure has been validated

across various patient populations including patients with mild-to-severe COPD [81, 89]. Administering this assessment would be beneficial for professionals attempting to determine whether a patient's apparent symptomatology more accurately reflects depression or anxiety.

Beck Depression Inventory (BDI-II)

The BDI-II is a 21-item self-report scale with four options under each item ranging from *Not present (0)* to *Severe (3)*. The total score indicates a patient's level of experienced depression (e.g., minimal, mild, moderate, and severe). This measure has been validated across several patient populations and has demonstrated adequate internal consistency ($\alpha = 0.91$), test–retest reliability (Pearson $r = 0.93$), and convergent validity (Pearson $r = 0.71$) [8, 9, 81].

Psychosocial Risk Factor Survey (PRFS)

The PRFS is a 70-item self-report scale that assesses psychosocial risk factors that can impact cardiopulmonary disease, including depression, anxiety, anger/hostility, social isolation, and emotional guardedness. This measure was specifically designed to be administered to pulmonary and cardiac patients and has been validated for patients in cardiac rehabilitation programs [28]. Of the selected measures discussed herein, the PRFS is the longest, but it provides a comprehensive assessment and should be utilized to determine areas of concern.

Suicidal Ideation Endorsement

Each of the assessments listed in Table 7.4 includes items related to suicidal ideation. It is important to review patient responses on the aforementioned screening tools prior to the conclusion of the appointment in order for potential suicidal ideation to be addressed promptly. Endorsement of suicidal ideation, whether via items on a questionnaire, direct patient report, or reports from a patient's support network, requires immediate attention. The American Association of Suicidology (AAS) has compiled a list of the top ten warning signs for suicide (facilitated with the acronym IS PATH WARM), which are ideation, substance use, purposelessness, anxiety, trapped, hopelessness, withdrawal, anger, recklessness, and mood change. Patients who are displaying several of these warning signals may be at risk for suicide [49].

Suicidal statements may be passive or active. For example, a patient making a passive suicidal statement may remark that they would be "better off dead" instead of dealing with the stressors of their pulmonary condition. In this type of instance, the patient is feeling hopeless but has not stated intention to end their life. Of course, it is imperative to evaluate this further. Active suicidal statements indicate that the patient has intent to complete suicide or has even made plans regarding the manner

in which they would do so. In the case of an actively suicidal patient, emergent assessment by a qualified mental health professional is necessary. Patients who are making passive suicidal ideation statements (and have denied having a plan, means, or intent) should be referred to a mental health professional or a consult can be arranged. Healthcare professionals are advised to become familiar with their institution's protocol and policies for the assessment and management of suicidal ideation. If your institution does not have a protocol in place, consider consulting with a mental health professional to develop policies and guidelines for assessing and managing suicidal ideation.

Impact on Engagement, Adherence, and Outcomes

Depression can affect a patient's engagement in activities. As previously mentioned, individuals with depression often present with anhedonia, loss of interest in activities, low energy, and feelings of worthlessness. When a patient lacks the desire or sense of ability to engage in enjoyable activities, this can lead to a vicious cycle and further exacerbation of symptoms. For example, not participating in pleasurable activities often results in more disengagement from these pastimes, which causes additional decrease in mood or intensifies feelings of worthlessness. In turn, lower mood and severe feelings of worthlessness have the consequence of even less involvement in activities, subsequently exacerbating depressive symptoms [102]. Pulmonary patients who are also experiencing depression have a compounded situation, since their medical condition often leads to limited energy and mobility in and of itself. Not only does limited energy and ability to engage in activities worsen depressive symptoms, but also in turn, elevated levels of depression can increase pulmonary symptoms. For example, becoming easily fatigued due to depression can increase the likelihood of experiencing dyspnea. Additionally, elevated levels of depression can further increase patients' perception of pain [101]. Individuals with depression may also engage in social activities less frequently, thereby inadvertently reducing their social support system, which is a critical element for coping with a chronic medical condition. Similarly, impaired sexual functioning or decreased sexual desire can lead to relationship strain and reduced HRQoL.

In addition to engaging less with pleasurable and social activities, patients experiencing depression may also adhere less to treatment regimens. Individuals with depression alone are three times less likely to adhere to medication regimens [26]. This is further compounded by the need for patients with pulmonary disease to comply with recommended oxygen use along with adhering to medication use. Compliance with oxygen use in individuals with COPD ranges from 45% to 70%, and this rate is likely even lower in individuals suffering from comorbid depression [53]. Moreover, depressed patients are more prone to discontinuing pulmonary rehabilitation [54].

Treatment outcomes for patients with pulmonary conditions can also be negatively affected by comorbid depression. Depression is associated with extended

hospital stay for pulmonary patients [31]. Furthermore, pulmonary patients who experience depression are more likely to continue smoking tobacco. Smoking can speed the deterioration of airways and raise the risk of mortality [13]. Unfortunately, depression is also associated with increased risk of 3-year mortality in patients with severe COPD [31].

Evidence-Based Treatment for Anxiety and Depression

Pharmacological Treatments

Various trials have demonstrated effective pharmacological interventions to reduce anxiety and depressive symptoms among patients with pulmonary diseases. Although benzodiazepine medications are often prescribed for panic attacks as a "rescue" medication for acute panic, benzodiazepines are not recommended to treat mental health concerns for patients with pulmonary disease as these medications can induce respiratory depression and compromise lung function [16, 69] and have potential for abuse and/or dependence [74]. Evidence suggests that other classes of medication, such as buspirone (anxiolytic), nortriptyline (tricyclic antidepressant), and sertraline (selective serotonin reuptake inhibitor, SSRI), are better alternatives for the management of mood and anxiety in patients with pulmonary conditions [16].

Although buspirone is an anxiolytic, it is not chemically related to benzodiazepines and, therefore, does not produce adverse sedation and respiratory depression effects. Overall, evidence regarding the efficacy of buspirone medication among pulmonary patients has been mixed. Some trials have shown buspirone to be effective in reducing anxiety and dyspnea as well as beneficial in improving exercise tolerance among patients with COPD [4, 105]; however, these effects were not replicated in a subsequent trial [88].

It has been suggested that antidepressant medications represent a safer alternative to benzodiazepines in treating patients with pulmonary disease with problematic anxiety symptoms [69]. One theory postulates that the serotonergic system mediates the connection between anxiety and dyspnea symptoms among patients with pulmonary conditions [69, 91]. Therefore, antidepressants may prove beneficial to reduce anxiety, dyspnea, and depressive symptoms among patients with respiratory disease. One study examining nortriptyline found it to be effective in reducing depression and anxiety symptoms among patients with COPD [15]. Another study found sertraline to be well tolerated among patients with COPD [91]; however, this small study included only seven patients with COPD, and further research needs to be conducted to definitively determine the efficacy of sertraline among patients with pulmonary conditions. These effects are unlikely to be limited to sertraline and could be generalizable to most or all SSRIs.

Although various pharmacological interventions have demonstrated effectiveness for treating anxiety and depressive symptoms, patients with pulmonary disease may be resistant to pharmacotherapy. Patients with pulmonary conditions are often

prescribed a multitude of medications to treat their medical condition(s), and are on average prescribed 2–9 medications to treat their pulmonary disease [14]. Due to this high volume of medications, it is not surprising that one study found that more than 70% of patients with pulmonary disease refused the addition of antidepressant pharmacotherapy [105]. Each additional medication further complicates the medication regimen of these pulmonary patients, requiring further cognitive capacity to manage the variety of pharmaceuticals being taken, leading to increased risk of cross-medication effects, adverse reactions, and difficulty maintaining accurate medication adherence. Taken together, these observations highlight the importance of offering nonpharmacological treatments to help patients develop skills to manage their anxiety and/or depression symptoms. See Chap. 9 for more information regarding other nonpharmacological treatments.

Psychological Treatments

Cognitive–behavioral therapy (CBT) remains the gold standard treatment approach to reducing anxiety and depression among patients with pulmonary disease. In addition, relaxation interventions have also been shown to be a highly effective treatment approach to reduce anxiety symptoms among pulmonary patients [16, 61]. Relaxation interventions can be administered in combination with CBT or as a stand-alone practice.

Progressive muscle relaxation (PMR) has a longstanding history as an effective relaxation intervention to reduce anxiety in patients with pulmonary disease [29, 61, 100]. PMR involves a sequence of deep muscle relaxation through tension-release movements that progress through muscle groups from head to toe [11]. PMR can be taught to patients in person or through auditory listening modalities and demonstrated effectiveness for anxiety and dyspnea reduction [36, 84]. Although prior studies on PMR have primarily examined the technique as a method to reduce anxiety, it also appears to be an effective intervention to reduce both anxiety and depression symptoms among patients with pulmonary arterial hypertension. After 12 weeks of regular PMR practice, patients with pulmonary arterial hypertension had reduced anxiety and depression symptoms as well as increased HRQoL [61].

Another commonly utilized relaxation technique, diaphragmatic breathing, is a commonly used method to help reduce anxiety and dyspnea among patients with pulmonary disease. Diaphragmatic breathing or deep breathing involves expanding and contracting the diaphragm during breathing so that the stomach (rather than chest) rises and falls with each breath. This type of deep breathing technique helps to reduce autonomic arousal, leading to decreased anxiety. The practice also serves to strengthen the diaphragm, allowing patients with pulmonary disease to use less effort and energy to breathe [38]. Evidence supports the use of diaphragmatic breathing and PMR relaxation techniques in combination with CBT to improve physical functioning as well as reduce anxiety and depression [16, 61]. It should be

noted that deep breathing can be quite difficult for patients with obstructive lung diseases such as COPD, and pursed-lip breathing is often taught in lieu of diaphragmatic breathing, as it likely induces a similar relaxation response.

Combined Pharmacological and Psychological Treatments

For patients who are amenable, the combination of pharmacological and psychological treatment may be an effective option. In clinical populations, the combination of pharmacological and psychological interventions has demonstrated effectiveness in reducing symptoms of depression and anxiety [46, 78]. Medication can be useful in reducing mood symptoms to a manageable level to allow the patient to successfully engage in the psychological treatment(s). Conversely, engagement in psychotherapy enables patients to develop skills to manage their anxiety or depression symptoms over long-term outcomes [79]. Therefore, due to the slower onset of benefits resulting from psychotherapy, it has been suggested that combined use of pharmacological and therapeutic interventions will increase a patient's overall engagement in care and development of coping skills [94].

Using Cognitive–Behavioral Techniques and Other Empirically Supported Strategies to Enhance Pulmonary Patient Engagement and Adherence

Cognitive–Behavioral Therapy

Although several evidence-based treatment options for anxiety and depression were discussed in the previous section, the focus for the remaining portion of the chapter will be CBT, as it has demonstrated robust effectiveness in the treatment of these disorders. CBT has strong support for reducing symptoms of anxiety and has even been shown to outperform pharmacological treatments in the long term [44]. CBT has been found to be as effective as pharmacological treatments in reducing symptoms and remission across varying severity levels of depression [99]. Additionally, combining CBT with pharmacological treatment enhances the rate of recovery as compared to treating depression with medication alone [45]. Compared to other active psychological treatments (e.g., relaxation techniques, psychodynamic therapy), CBT is equally effective or superior in reducing symptoms of depression [44].

Most research surrounding the effectiveness of CBT for anxiety and depression involves participants who do not have comorbid medical conditions. However, there is emerging evidence that CBT improves symptoms of anxiety and depression in patients with pulmonary conditions such as COPD [32, 97]. As compared to routine care, COPD patients treated with CBT have shown decreased ratings of dyspnea

[63]. Furthermore, patients with comorbid COPD, anxiety, and depression who were treated with CBT had improvements in exercise capacity and fatigue in addition to a reduction in anxiety and depressive symptomatology [66]. Unfortunately, there are few studies that have examined the effectiveness of CBT in individuals with pulmonary conditions, and most have small sample sizes [82, 94]. Additional randomized controlled trials with larger sample sizes are needed to examine CBT in individuals with pulmonary conditions and comorbid anxiety and depression for confidence in treatment effects.

Cognitive–Behavioral Model

The treatment principles of CBT are based around the core concepts of the cognitive–behavioral model (see Fig. 7.2). Two of the foundational concepts of this model are that our cognitions influence our emotions and behaviors and our behaviors affect our cognitions and emotions. Essentially, our thoughts, emotions, and behaviors are all related. When an event occurs, we cognitively appraise the situation, react emotionally to this appraisal, and act accordingly. Sometimes, especially in individuals suffering from anxiety and depression, cognitions can be distorted and potentially debilitating [102].

Patients with pulmonary disease who are experiencing anxiety and depression may have dysfunctional thoughts related to their inability to do things or hopelessness about their condition. For example, they may feel sure that something bad will happen, that they are a failure, or that they do not have a future. Fortunately, there are cognitive and behavioral techniques that can remediate these dysfunctional thought patterns. Mental health professionals can work with

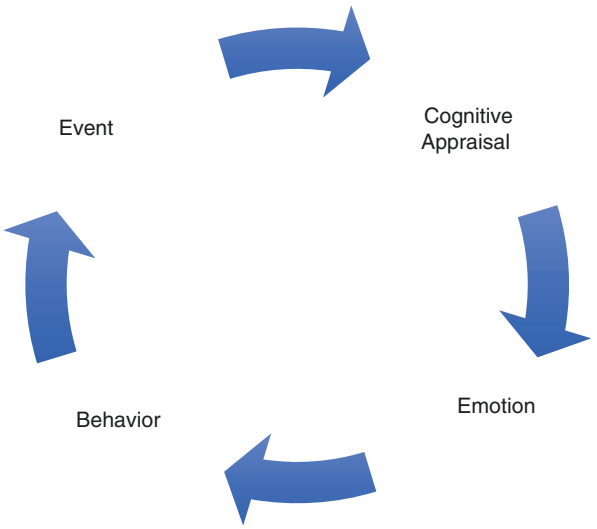

Fig. 7.2 Cognitive–behavioral model

patients to restructure maladaptive cognitive processes. This involves helping the patient identify cognitive distortions and dysfunctional thoughts in order to promote a more rational style of thinking [102]. For example, a patient may question the benefit of incorporating exercise into their daily routine if they have been smoking tobacco cigarettes for several years or have not yet ceased smoking. In this case, the professional can help the patient identify maladaptive all-or-nothing thinking and restructure this thought process to recognize that increasing physical activity is a positive behavior change that will benefit their health, despite their smoking status.

Behavioral techniques can be suggested by mental health or pulmonary rehabilitation professionals to help patients reduce their symptoms of anxiety and depression. For example, patients who are avoiding exercise due to the fear of experiencing dyspnea can be encouraged to engage in activity under supervision and can be gradually exposed to exercise. Relaxation techniques, such as the previously described diaphragmatic breathing or PMR, can also assist patients in reducing their experienced anxiety. For patients who are experiencing depression, behavioral activation (see Chap. 11) can help the patient become more engaged and give them a sense of accomplishment. Working collaboratively with the patient to identify specific activities and developing a realistic plan to employ these activities can lead to an improvement in mood. These activities should be scheduled in the patient's calendar to increase accountability and likelihood that the activity will actually be completed. Furthermore, the activities should be enjoyable and something that will give the patient a sense of mastery and accomplishment [102].

The utilization of formal CBT requires specific and extensive training as well as a clinical background. Therefore, providing this intervention is outside the scope of practice for most pulmonary healthcare professionals, and patients should be referred to a mental health professional for CBT. For mental health professionals (e.g., psychologists, mental health counselors, psychiatrists, and social workers) interested in additional focused training in CBT, in-person and online training and certification is available through The Beck Institute. For mental health professionals working in the Veterans Health Administration system, programs that provide competency-based training in CBT are available.

Recommendations for Healthcare Professionals

The importance of incorporating psychological assessment into treatment for pulmonary disease has already been reviewed, as psychological factors may impact adherence to treatment and subsequent outcomes. When significant psychological concerns are identified, healthcare professionals can refer to a behavioral specialist (e.g., psychologist, psychiatrist, and licensed mental health counselor) for further evaluation and treatment; however, healthcare professionals are well equipped to provide various interventions to improve psychological functioning for patients with pulmonary disease, even in the absence of a mental health professional. Below

are examples of practical interventions that healthcare professionals from diverse backgrounds can provide or suggest to patients with lung disease to improve psychological functioning, thereby improving patient adherence and engagement.

Identify a Mental Health Professional Team Member Every clinician working with individuals with pulmonary disease should be screening for the presence of anxiety and depressive symptoms, as this screening can be highly valuable in at least identifying those patients who might require a more detailed mental health evaluation. Healthcare professionals working in family and primary care settings are often comfortable screening for these symptoms and prescribing psychotropic medications and providing therapeutic contact as needed. Pulmonary specialists may focus more on the physiological aspects of the disease, although they often have access to pulmonary rehabilitation programs in which a psychological assessment can be conducted. In the case that the existing pulmonary rehabilitation program does not offer this service, healthcare professionals should seek a partnered relationship with a mental health professional or at least a strong referral resource. Generally, these professionals will possess a master's degree or above and fall into one of the following disciplines: clinical psychologist, counselor, social worker, or addictions counselor.

Refer Patients to Pulmonary Rehabilitation Pulmonary rehabilitation (PR) is considered an essential component of the standard of care for individuals who are symptomatic from their pulmonary conditions [2]. Studies have demonstrated that symptoms of anxiety and depression improve following completion of PR programs [39, 80]. Despite the emerging evidence to support the beneficial effect of PR in improving anxiety and depression symptoms in individuals with pulmonary disease [37], the majority of patients with pulmonary disease never participate in PR [41]. Recent guidelines support the inclusion of psychological interventions as a component of comprehensive PR programs [85].

Let Patients Know That Exercise Is Safe for Them Research supports the benefits of exercise for improving depression and anxiety symptoms [86]. However, many patients with pulmonary disease report fears regarding the potential impact of exercise on their medical condition. Many patients want reassurance from their primary care healthcare professionals (physicians or pulmonologists) that it is safe for them to engage in exercise. When recommending pulmonary rehabilitation, patients' concerns should be acknowledged and normalized, and healthcare professionals can offer reassurance and details about the quantity and intensity of supervised exercise that is safe for them. Exercise is one of the most important but one of the most difficult activities for individuals with respiratory disease to do, despite the beneficial effects of exercise on diseases like COPD. A referral to PR is useful in helping a patient who is unsure of how to get started with physical activity, as exercise is one of the primary interventions to improve psychological functioning that all PR programs are currently providing.

Encourage Hobbies, Interests, and Other Activities Patients with chronic respiratory disease often give up or lose interest in activities they previously enjoyed because they believe the effort to engage in these activities is not worth the benefits.

Healthcare professionals can assist patients with brainstorming ways to adapt or modify previously enjoyed activities (e.g., sitting on a stool while cooking if standing is difficult) to facilitate participation so that patients can continue to enjoy the mood-boosting benefits of engaging in these activities. Healthcare professionals may encourage patients who require oxygen to bring a hands-free oxygen carrier to activities they enjoy so they can participate in activities like golf, gardening, going fishing, or walking the dog. If a patient's hobby involves a lot of dust, like woodworking, they can be encouraged to wear a mask in a well-ventilated area.

Encourage and Facilitate Social Support Individuals with pulmonary disease who lack adequate social support often have worse health outcomes [50]. Healthcare professionals can assist with enhancing the patient's social support by acting as a caring professional and engaging in active listening and motivational interviewing techniques (see Chap. 6), as well as engaging in patient advocacy efforts and facilitation of resource acquisition. Patients should be encouraged to utilize existing social support networks by seeking support from family, friends, and other PR program participants if the patient is involved in PR. Healthcare professionals should encourage patient involvement in support groups that facilitate the sharing of personal experiences, emotions, successful coping skills, and disease-related information. Support groups may be run by patients or facilitated by mental health or healthcare professionals. Social support can also be facilitated through the involvement of a patient's spouse, caregiver, or support person. Should significant interpersonal or family conflicts surface, referral to a mental health professional for assessment and treatment of problematic dynamics is recommended.

Discuss Sexual Health and Functioning Pulmonary disease often negatively impacts sexual intimacy and functioning, but many patients are hesitant to discuss sexual health issues with their doctors. Depression and anxiety can further affect sexual interest and functioning beyond pulmonary disease alone [51]. Healthcare professionals are well positioned to improve psychological functioning and HRQoL in patients by offering a safe place to discuss sexual issues and providing education to those patients willing to engage in conversations about sex.

Provide Resources for Relaxation Exercises Individuals with or without pulmonary disease tend to breathe faster and shallower when stressed and/or experiencing strong emotions, which can lead to shortness of breath and sometimes panic. As feeling short of breath is especially problematic for patients with lung disease, strategies to control the distressing experience of breathlessness have been taught to patients with pulmonary disease for a long time. Patients with pulmonary disease can minimize the risk of becoming breathless during times of stress or high anxiety by using relaxed breathing techniques, which can easily be provided by healthcare professionals. Relaxed breathing (often called diaphragmatic breathing) is a way of interrupting the "Fight or Flight" response and promoting the body's natural relaxation response. Research has demonstrated that interventions such as mindfulness-based therapy, relaxation, and yoga lead to reduced anxiety and depression and improved physical

outcomes (i.e., lung function, exercise capacity, fatigue, and dyspnea) in individuals with pulmonary disease and comorbid psychological distress [96]. Various mobile phone applications and websites exist for relaxation exercises, including breathing retraining, progressive muscle relaxation, and mindfulness meditation.

The above interventions are only a sampling of ways that healthcare professionals can promote psychological functioning and improve HRQoL in patients with pulmonary disease. Despite various ways that healthcare professionals can intervene when a patient presents with significant emotional concerns, all healthcare professionals should have a partnered relationship with a behavioral professional and be prepared to offer a referral when indicated. Psychological interventions can be effective in reducing distress and improving HRQoL, thereby improving patient engagement and adherence, and should therefore be a part of every comprehensive treatment plan for individuals with pulmonary disease.

Conclusions

Anxiety and depression are common and significant comorbidities in patients with pulmonary conditions. Psychological issues can impede patient engagement and adherence, leading to poor outcomes, including increased mortality rates, more frequent exacerbations, longer hospital stays, and reduced HRQoL and functional status. Despite the increasing awareness of the prevalence and importance of anxiety and depressive symptoms compared to the general population, mental health problems often go undiagnosed and, therefore, untreated in patients with respiratory disease. Thus, screening for anxiety and depression is crucial in this population. There are empirically supported treatments that can improve psychological symptoms and, therefore, adherence, engagement, and ultimately medical outcomes in patients with pulmonary conditions. The integration of pulmonary rehabilitation and psychological therapies such as CBT may lead to significant benefits for patients, specifically improved emotional functioning, which leads to increased engagement in healthcare and adherence to treatment regimens. Although patients experiencing substantial mental health concerns should be referred to a mental health professional for further evaluation and treatment, this chapter has highlighted various strategies healthcare professionals can utilize when working with patients with pulmonary conditions to facilitate improvement of anxiety and depression symptoms, thereby improving engagement and adherence.

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