

PSYCHOSOCIAL ASSESSMENT AND INTERVENTION IN PATIENTS UNDERGOING PULMONARY REHABILITATION

PSİKOSOSYAL DEĞERLENDİRME VE PULMONER REHABİLİTASYON HASTALARINA YÖNELİK GİRİŞİMLER

Erinn Barker

Duke University School of Medicine, Physical Therapy, Durham, North Carolina, USA

e-mail: erinn.barker@duke.edu

DOI:10.5152/tcb.2015.052

Abstract

Psychosocial factors significantly affect the pulmonary rehabilitation process in patients dealing with chronic obstructive pulmonary diseases. Their outcomes can be optimized by the evaluation of the psychological, cognitive, or social barriers to the rehabilitation process, followed by appropriate interventions and referral to the suitable practitioners. Publicly available screening tests for depression, anxiety, and cognitive decline, such as the Center for Epidemiological Studies-Depression (CES-D), Generalized Anxiety Disorder-7 item test (GAD-7), and Montreal Cognitive Assessment (MoCA), respectively, are all valid reliable tools for assessing and measuring progress. Depression, anxiety, and cognitive decline all affect patients' adherence to rehabilitation programs, whereas smoking is counterproductive to the rehabilitation process. Smoking, while not being a specific psychological disorder, is a lifestyle habit requiring patients' willingness to change, to further optimize outcomes and decrease the risk of disease exacerbation. Effective motivational conversations and smoking cessation therapies are necessary for improving patients' willingness to change their detrimental behavior. Addressing these psychosocial barriers in the setting of pulmonary rehabilitation via access to psychologists, family counselors, as well as help from responsible caregivers can improve the patients' overall medical compliance, physical function, and quality of life.

Key words: Depression, anxiety, pulmonary rehabilitation, Chronic Obstructive Pulmonary Disorders, smoking cessation

Özet

Psikososyal etkenler, kronik obstrüktif akciğer hastalığı olanlarda pulmoner rehabilitasyon sürecini anlamlı şekilde etkilerler. Sonuçlar, ilk olarak rehabilitasyon süreci önündeki psikolojik, algısal ve sosyal engelleri berlileyerek, ikinci olarak da uygun girişimler veya hastayı uygun kişilere yönlendirerek, en iyi seviyeye getirilebilir. Toplumun kullanımına uygun, depresyon, aknsiyete ve algılama bozukluğunda yeri olan Center for Epidemiological Studies-Depression (CES-D), Generalized Anxiety Disorder-7 item test (GAD-7) ve Montreal Cognitive Assessment (MoCA) gibi testlerin hepsi geçerli ve süreci değerlendirmekte güvenilir araçlardır. Depresyon, anksiyete ve algılama bozukluğunun hepsi de hastanın rehabilitasyon programına katılımını etkilerken, sigara içilmesi rehabilitasyon sürecine zarar verir. Psikososyal bir engel olmamakla birlikte sigara kullanımı, hastanın daha iyi sonuç elde edebilmesi ve hastalığın nüks riskini düşürmesi için değiştirmesi gereken bir alışkanlıktır. Etkili motive edici konuşmalar ve sigara bırakma terapileri, hastanın bu zararlı davranışını bırakmasında gereklidir. Psikolog ve aile danışmanı yardımıyla pulmoner rehabilitasyonun başlangıcında bu engellerin ortaya konması ve sorumlu tedavi sağlayıcıların yardımının kaydedilmesi, genel tıbbi uyumluluğu, fiziksel işlevleri ve yaşam kalitesini iyileştirebilir.

Anahtar kelimeler: Depresyon, anksiyete, pulmoner rehabilitasyon, KOAH, sigarayı bırakma

INTRODUCTION

An accurate and complete assessment of the disability and response to treatment of patients with pulmonary conditions must occur within the context of their psychological and social circumstances (1). For instance, the improvement in pulmonary function by participating in a pulmonary rehabilitation program can

be limited if significant psychosocial issues are present and are not addressed. This chapter presents the common psychosocial issues faced by people who participate in pulmonary rehabilitation programs and discusses the methods for the appropriate assessment and interventions for them.

Psychosocial concerns, by definition, involve psychological and social components. These include

emotional, cognitive, and behavioral components, along with social values, social support, and social systems within family, school, work, religious institutions, and government. Feelings, beliefs, expectations, and coping styles are also psychosocial concerns that contribute to the outcomes of pulmonary rehabilitation. The relationships between the physiological aspects of pulmonary rehabilitation and the psychosocial concerns are complex. Further, it is fair to say it is unclear on exactly how and to what magnitude these concerns influence pulmonary rehabilitation outcomes. However, the literature supports the hypothesis that depression, anxiety, and cognitive impairment are key psychosocial issues that require assessment and intervention in pulmonary rehabilitation (2-4).

Prevalence of psychosocial concerns

Psychosocial morbidity is common in patients with chronic respiratory disease that is severe enough to necessitate referral for pulmonary rehabilitation. In the following paragraphs, we will discuss the prevalence of anxiety, depression, cognitive impairment, and other psychosocial concerns.

Depression and anxiety

Depression and anxiety are the most common psychosocial concerns seen in patients with chronic pulmonary conditions who are enrolled in pulmonary rehabilitation (3). Estimates of the prevalence of depression and anxiety in the pulmonary population range from 10% to 80% in some studies (3). This variation is due to the disparity of two major factors: the instruments and methods used to screen and detect depression and anxiety in chronic obstructive pulmonary disorders (COPD) as well as the people included in the various studies. The prevalence is also higher in patients with more severe COPD and in those requiring supplemental oxygen. Some estimates suggest that patients are two and a half times more likely to have anxiety and depression than healthy persons (4). These psychological disorders are also common in other lung diseases, including interstitial lung disease and pulmonary hypertension (5).

Cognitive Impairment

Cognitive impairment is prevalent in COPD and can be complicated by chronic hypoxemia (6-7). Cognitive impairment increases as COPD progresses (8-9), with abnormalities in the Mini-Mental State Examination (MMSE, scores <24/30), Trail Making Test A (TMT-A, times >94 s), and Trail Making Test B (TMT-B, times >283 s) present in 33%, 49.5%, and 40% of

patients with COPD, respectively (7). These impairments include those in recent memory, construction, visual processing, number sequencing, attention, language and orientation, cognition flexibility, and shifting capacity. Obviously, cognitive impairments have implications in pulmonary rehabilitation in terms of education and self-management strategies. Some have suggested that cognitive impairment should be considered a primary component of hypoxemic COPD and not a mere comorbidity of this disease (9). Further, cognitive impairment can contribute to a person's inability to self-manage their medications, finances, or activities of daily living. Impaired performance in tests that require a drawing task, such as drawing a clock, or other complex goal-directed cognitive tasks indicates problems with judgment and complexity, and it has been proposed to be prognostic in hypoxemic COPD patients (10).

Other Psychosocial Concerns

Other key psychosocial concerns are coping, stress, motivation, and chemical dependency issues such as smoking. Although their prevalence is not as well characterized as anxiety, depression, and cognitive impairment, they nevertheless can impair a person's ability to gain as much as possible from pulmonary rehabilitation. All these concerns should be assessed along with social support issues, such as family involvement, to develop appropriate individualized plans for rehabilitation.

Assessment of psychosocial concerns

The following will deal with the practical aspects of assessing psychosocial morbidity in patients referred for pulmonary rehabilitation.

Depression

Depression is an adjustment disorder that exists on a continuum from feelings of sadness to major depressive illness. Simple mood disturbance is typically associated with and identifiable life stressor, which is commonplace in chronic disease. A person with a simple mood disturbance who begins pulmonary rehabilitation should be able to adequately participate in the program and, with encouragement, have positive outcomes. However, someone with a major depressive disorder would need to be treated aggressively within and beyond the rehabilitation program. Unless this major depression is recognized and treated, the person will probably not realize his potential gains in the outcomes of pulmonary rehabilitation.

Table 1. Major Depressive Disorder and Depressive Episodes	
<p>Depressed mood or a loss of interest or pleasure in daily activity nearly every day for the same two week period.</p> <p>Mood represents a change from the person's baseline.</p> <p>Impaired function: social, occupational, educational.</p> <p>Not attributable to the physiological effects of a substance or to another medical condition.</p> <p>Not attributable to another psychoaffective disorder</p> <p>There has never been a manic or hypomanic episode.</p> <p>The diagnosis of depression or major depressive episode following a significant personal loss requires the exercise of clinical judgment based on the individual's history and cultural norms for the expression of distress in the context of loss.</p>	<p>Specific symptoms, at least 5 of these 9, present nearly every day for the same two-week period:</p> <p>Depressed mood most of the day, nearly every day, as indicated by either subjective report (e.g., feeling sad, empty, or hopeless) or by observation made by others (e.g., appearing tearful).</p> <p>Markedly diminished interest or pleasure in all, or almost all, activities most of each day, nearly every day.</p> <p>Significant weight change (5%) or change in appetite.</p> <p>Change in sleep: insomnia or hypersomnia.</p> <p>Change in activity: psychomotor agitation or retardation.</p> <p>Fatigue or loss of energy</p> <p>Guilt/worthlessness: feelings of worthlessness or excessive or inappropriate guilt.</p> <p>Concentration: diminished ability to think or concentrate or more indecisiveness.</p> <p>Recurrent thoughts of death or suicide, or has suicide plan.</p>

Screening for Depression in the Pulmonary Rehabilitation Program

Although it is important to be aware of these criteria, the diagnosis must be made by a licensed professional. What is critical for a pulmonary rehabilitation program is to adequately screen for depression, identify those in need, and refer when necessary for professional assessment and treatment. Table 1 lists the criteria for diagnosing major depressive disorder as defined by the Diagnostic and Statistical Manual for Mental Disorders- 5th Edition (11).

A recent study has determined that the following two simple questions from the Primary care Evaluation of Mental Disorders (PRIME-MD) are able to adequately screen those (94.6% sensitivity) who need further depression evaluation (3, 12-13)

- In the past two weeks, have you felt bothered a lot by:
- little interest or pleasure in doing things?
 - feeling down, depressed, or hopeless?

These questions have proven to be sensitive and reasonably predictive of depression that requires further evaluation. If the answer to one of these questions remains affirmative (especially at the conclusion of pulmonary rehabilitation), consideration should be given to referring the patient for further evaluation by a mental health professional.

Assessing Depression and Depressive Symptoms as an Outcome in Pulmonary Rehabilitation

Although the two questions of the PRIME-MD are appropriate screening questions, programs that would like a more in-depth tool to screen for depressive symptoms and measure depression as an outcome need to consider other established measures. Desirable tools do not include physical symptoms (such as fatigue or tiredness) so that the mood and emotional issues can be separated from physical changes that typically result from the disease and the exercise components of pulmonary rehabilitation.

Two possible tools are the Geriatric Depression Scale (GDS) and the Center for Epidemiological Studies Depression Scale Revised (CES-DR). Both are within the public domain. GDS is a fifteen item tool that is answered with "yes" or "no;" so it can be administered quickly (14). A score of 5 or greater on GDS should prompt further evaluation, and a score of 10 or greater requires immediate referral. The recently updated CES-DR measure symptoms of depression in nine different groups as defined by the American Psychiatric Association Diagnostic and Statistical Manual, fourth edition (15). A score less than 16 is considered normal. A score of 16-24 indicates borderline elevation of depressed symptoms and should be considered for referral. Patients scoring 24 and above should

Table 2. Anxiety disorders defined by the Diagnostic and Statistical Manual for Mental Disorders-5

<p>Excessive anxiety and worry occurring more days than not for at least six months around a number of events or activities (such as work or school performance)</p> <p>Difficult to control the worry</p> <p>The anxiety, worry, or physical symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.</p> <p>The disturbance is not attributable to the physiological effects of a substance or other medical condition</p> <p>The disturbance is not better explained by another mental disorder</p>	<p>Anxiety and worry are associated with three or more of the following, with at least three or more of the symptoms being present for more days than not for the past six months:</p> <p>Restlessness or feeling keyed up or on edge</p> <p>Being easily fatigued</p> <p>Difficulty concentrating or mind going blank</p> <p>Irritability</p> <p>Muscle tension</p> <p>Sleep disturbance (difficulty falling or staying asleep, or restless, unsatisfying sleep)</p>
--	---

be immediately referred for evaluation. Both of these instruments can be used successfully for screening and as outcome measures.

Anxiety

Similar to depression, anxiety can be considered on a continuum from generalized anxiety to panic disorder. Anxiety can frequently be present along with depression, and some recent reports have suggested they may be interrelated (13, 16-17). The recent Diagnostic and Statistical Manual of Mental Disorder-5th edition (DSM-5) (11) describes anxiety disorders and panic attacks this way:

Anxiety disorders include disorders that share features of excessive fear and anxiety and related behavioral disturbances. Fear is the emotional response to real or perceived imminent threat, whereas anxiety is anticipation of future threat. Panic attacks feature prominently within the anxiety disorders as a particular type of fear response.

Anxiety may be associated with excessive feelings of somatic stress such as fatigue, restlessness, irritability, rapid speech, sleep disturbances, tachycardia, dyspnea, and sweating. Generalized anxiety would be present if these symptoms and the apprehension described in Table 2 are present more days than not over a six-month period. Because patients with pulmonary conditions commonly have fatigue, dyspnea, tachycardia, and sleep disturbances, their interpretation in the context of anxiety assessment can be difficult to identify clinically.

An additional difficulty is that there is a condition called adjustment disorder with generalized anxiety, which refers to adjustment to major life events within three months of the event but not longer than

six months after the termination of the stressor (e.g., recent severe exacerbation of a disease requiring hospitalization) (11). The problem can be that there may not have been six months between the event and the time the person enrolled in a pulmonary rehabilitation program; therefore, an adjustment disorder may not be reliably differentiated from generalized anxiety. In this case, it is important to ascertain whether there were troubling symptoms for a substantial period before hospitalization and for referral to appropriate psychological support.

Panic attacks are farther along the continuum, defined as intense episodes of acute anxiety with dyspnea and cognitive fears. It can be difficult to separate the dyspnea associated with a panic attack from a severe acute episode of dyspnea resulting from underlying physical illness clinically. Panic disorder involves recurrent unexpected episodes or panic attacks that are coupled with persistent concern about other attacks and worry about implications of such attacks (11). Panic attacks and panic disorder are serious issues that may require further evaluation and treatment outside of pulmonary rehabilitation. Generalized anxiety and panic attacks can clearly interfere with maximizing benefits from rehabilitation. However, with appropriate support, the rehabilitation environment can be therapeutic to patients experiencing panic (17).

Screening for panic disorder and generalized anxiety disorder

Similar to depression, it is important to be aware of these criteria, but it is not necessary to diagnose the conditions—patients need only be adequately screened for them. Table 3 lists the DSM-5 criteria for diagnosing panic disorder. The same study that used questions

Table 3. Panic attacks defined by the Diagnostic and Statistical Manual for Mental Disorders-5	
<p>At least one of the attacks has been followed by one month or more of one or both of the following:</p> <p>Persistent concern or worry about additional panic attacks or their consequences</p> <p>A significant maladaptive change in behavior related to the attacks (behaviors designed to avoid having panic attacks, such as avoidance of exercise or unfamiliar situations)</p> <p>The disturbance is not attributable to the physiological effects of a substance or other medical condition</p> <p>The disturbance is not better explained by another mental disorder.</p>	<p>Recurrent panic attacks with four or more of the following symptoms reach a peak within minutes</p> <p>Palpitations, pounding heart, or accelerated heart rate</p> <p>Sweating</p> <p>Trembling or shaking</p> <p>Sensations of shortness of breath or smothering</p> <p>Feelings of choking</p> <p>Chest pain or discomfort</p> <p>Nausea or abdominal distress</p> <p>Feeling dizzy, unsteady, light-headed, or faint</p> <p>Chills or heat sensations</p> <p>Paresthesias (numbness or tingling sensations)</p> <p>Derealizations (feelings of unreality) or depersonalization (being detached from oneself)</p> <p>Fear of losing control or “going crazy”</p> <p>Fear of dying</p>

from the PRIME-MD to screen for depression also successfully used the following three questions to adequately screen for anxiety (4, 12-13) The first two questions are phrased similarly to the depression screening question, but the third question attempts to capture more severe episodes such as panic attacks (4, 12)

In the past month, have you felt bothered a lot by:
 Nerves, or feeling anxious or being on edge?
 Worrying about a lot of different things?
 In the last month

Have you had an anxiety attack (suddenly feeling fear or panic)?

If, at the conclusion of the pulmonary rehabilitation, the answer to one of these questions remains affirmative, the patient should receive further evaluation by a mental health professional.

The controlled exercise sessions associated with pulmonary rehabilitation are a perfect venue to help determine if panic attacks are a feature associated with dyspnea episodes and should also be considered a part of an assessment of anxiety.

Assessing anxiety and worry as an outcome in pulmonary rehabilitation

The three PRIME-MD questions are adequate screening questions for rehabilitation programs, but if a more in-depth evaluation of anxiety is preferred, there

are established anxiety measures. The Generalized Anxiety Disorder 7 (GAD-7) is a valid screening tool for multi-morbid populations (18). GAD-7 is a seven-item tool that is answered on a scale of 0 (never) to 3 (nearly every day), with an eighth question on how distressing the symptoms are. A score of 5 or greater on GAD-7 indicates mild anxiety, and a score of 10 or greater indicates the need for referral. The Penn State Worry Questionnaire (PSWQ) and its psychometrically valid brief version PSWQ-A are other public domain questionnaires that can be used to screen and measure outcomes (18-20). PSWQ scores range from 16 to 80. With a score of 50, PSWQ could correctly identify clinical status with 71.7% sensitivity and 99.9% specificity. PSWQ-A has a cut-off score of 23 indicating anxiety with 77.0% sensitivity and 92.5% specificity (20).

These outcomes listed above are by no means an exhaustive list of available outcomes to screen and measure both depression and anxiety in respiratory patients. Other outcomes commonly used include the Hospital Anxiety and Depression Scale, the Chronic Respiratory Questionnaire (20), Ferrans and Powers Quality of Life Index, and the Short Form-36 (21).

Cognitive impairment

The gold standard for screening for cognitive impairment is the Mini Mental State Exam (6, 22-23).

Open-ended questions	Information that empowers the patient
What concerns you about...?	Would you like to know more about...?
How might you...?	Would you be interested in...?
What needs to happen for you to...?	May I tell you how others have successfully managed...?
What are the positives you'll get from...?	May I give you a brochure on...?
What is the downside if you...?	What information have you received about your... (meal plan, new diagnosis, home exercise program, new medication, etc.)?
What will hinder you from ...?	What do you already know about...?
What type of support do you have to ...?	What questions do you have about...?

However, the Montreal Cognitive Assessment score (24-25) has been used to successfully screen and set a baseline and track progress following a rehabilitation program. There is some debate as to the ability of MMSE to adequately screen for mild cognitive impairment. MMSE has been described earlier; those who score lower than 23/30 needing to be referred for further evaluation by a neurologist and a speech-language pathologist. MoCA was developed by Nasreddine in 2005 and is described this way:

Montreal Cognitive Assessment is a 30-point test that takes between 10 and 15 minutes to complete and assesses several cognitive domains. A score below 26 points shows a mild cognitive impairment. It assesses visuospatial abilities using a clock-drawing task (3 points) and a three-dimensional cube copy (1 point). Multiple aspects of executive functions are assessed using a trail making task (1 point), a phonemic fluency task (1 point), and a two-item verbal abstraction task (2 points). Language is assessed using a three-item confrontation naming task with familiar animals (3 points) and the repetition of two syntactically complex sentences (2 points). Short-term memory is evaluated with a task that involves two learning trials of five nouns, and a delayed recall after approximately 5 minutes (5 points). Attention, concentration, and working memory are evaluated using a sustained attentions task (target detection using tapping, 1 point) digits forward and backward (1 point each), and a serial subtraction task (3 points). At the end of the test, orientation and place is assessed (6 points) (24-25).

The recently published Health and Retirement Study does indicate that patients with COPD are twice as likely to develop mild cognitive impairment, which increases the overall disability experienced by a patient (23). There is little evidence that cognition improves with pulmonary rehabilitation, despite other physical function gains.

Other Psychosocial Concerns

Methods of screening for other psychosocial concerns are not as standardized as for anxiety, depression, or cognitive impairment. The key is being able to assess psychological issues that could interfere with potential improvements gained from participation in pulmonary rehabilitation. The key concerns such as motivation, self-efficacy, coping, social support, medication adherence, and chemical dependency issues (e.g., smoking any substances) all necessitate general intake questions.

Evidence-based health coaching and asking open-ended questions to begin having conversations for behavior change have shown significant improvements with medication compliance and adherence (26), smoking cessation (27) and shown modest improvements with increasing physical activity (28). Table 4 outlines open-ended questions practitioners can ask to improve the conversation and patient compliance with medical interventions.

Motivation

Motivation is the drive of a person wanting to change either factors in their environment or within themselves. This important psychosocial concern affects participation in pulmonary rehabilitation and is influenced by multiple factors. Most patients who enter pulmonary rehabilitation have experienced important events or situations, such as a physician diagnosis of a chronic respiratory disease, a recent hospitalization, or a spouse who has become concerned about the patient's health. These events and situations can provide an incentive to many who might not have previously considered pulmonary rehabilitation, thus improving motivation.

Anecdotally, patients who perceive their illness to be relatively severe and feel threatened by their

illness may be more motivated to attend rehabilitation. However, the severity and vulnerability can also immobilize people if they perceive that nothing can be done to improve their condition. In such cases, simply beginning a pulmonary rehabilitation program can go a long way toward motivating a person by demonstrating the potential for improvement. Perceived benefits are important points that will help motivate a person in pulmonary rehabilitation. An open and honest discussion at the outset of rehabilitation regarding its perceived benefits will help expose the patient's personal barriers to participation. Frequently, motivation can be sparked if a particularly troublesome symptom is targeted during the initial assessment or if a return to participation in a preferred activity is seen as attainable.

Self-Efficacy

Self-efficacy is the belief that one is capable of creating change both in their environment and within themselves. In the rehabilitation context, patients must believe they can perform at least some of the techniques and exercises before they will be sufficiently motivated to engage in pulmonary rehabilitation. Higher self-esteem is related to higher general self-efficacy; believing in one's capacity to cope with everyday challenges is important in managing a disease process (29). This can be achieved by providing patients with an opportunity to observe or take part in a brief exercise session at the initial meeting or by instructing in the proper use of an inhaler with the patient demonstrating the exercises and inhaler technique back to the therapist. Practitioners can also give examples of program participants with similar diseases and circumstances who have been successful. Through this, prospective patients may gain a better perspective of their own illness, not feel so isolated, and feel more capable of creating change.

Interventions for psychosocial concerns

Pulmonary rehabilitation as a real advantage when it comes to treating many psychosocial concerns, because exercise is one of the best interventions for anxiety, depression, and stress relief. Even a sort course of pulmonary rehabilitation has been shown to cause improvements in depression, verbal memory, and visuospatial functioning (30). When compared directly with pulmonary patients without anxiety or depression, a 7-week pulmonary rehabilitation program significantly decreased both anxiety and depression in those patients with clinically high scores on the HADS (31).

Apart from participating in the exercise portion of the rehabilitation program, patients can take prescribed medications that can improve depression and lower anxiety. The specific medications will not be reviewed here, but it is important to understand that most of these medications will not take effect immediately—it can take as long as several weeks before the person will feel the impact. Unless otherwise indicated by the person's health care provider, participation in the exercise portion of rehabilitation should not be restricted on the basis of depression or anxiety. However, anxiety, depression, and cognitive impairments can all influence a person's ability to focus and learn from any formal educational class. Care must be taken to individualize the program when the patient has these psychosocial concerns.

It appears that exercise training produces little if any improvement in cognitive function in hypoxic COPD (9). Therefore, it may be necessary to adapt and tailor the program so that people with cognitive impairments can obtain the essential knowledge needed to self-manage their disease. If a person's cognitive impairments are such that judgment and retention of information are impaired, a significant other or caregiver needs to be an integral partner in the rehabilitation process. Further, the age-old strategy of "repetition, repetition, repetition" can be very helpful in reinforcing information retention.

Interventions for other psychological concerns

This section addresses two other important psychosocial issues common to patients referred to pulmonary rehabilitation: inadequate social support and cigarette smoking. Although cigarette smoking is a physical addiction with major systemic consequences, it has a very prominent psychosocial component as well, which will be discussed in this section.

Building support systems

The psychosocial intervention perhaps most fundamental to pulmonary rehabilitation is developing an adequate support system. Hill et al reviewed the literature for components of pulmonary rehabilitation excluding exercise training and reports several effects, including support systems. The impaired exercise tolerance and excessive feelings of dyspnea during daily activities result in people becoming more homebound as they decrease participation in physical activities. Those who participate in pulmonary rehabilitation report enjoying the social aspect of training together; the interactions result in the provision and reception

of emotional support, which serves to motivate and encourage one another. Exercising in a peer group and opportunities for social interaction are important components for maintaining a long-term physically active lifestyle (32).

Caregivers and patient support groups assist in dealing with the disease and taking an active role in their disease management. A support group is a place to share thoughts, feelings, and experiences, as well as provide and receive support and friendship with peers who experience the same obstacles and problems. These groups may be organized by people with COPD, but may be facilitated by respiratory health professionals. People with COPD should be encouraged to participate in a local support group over the course of the rehabilitation program (32).

Social support can also be fostered through the involvement of the patient's spouse or support person. Significant others should be encouraged to participate in support groups in which family dynamics and interpersonal skills can be observed, information can be shared, misperceptions can be clarified, and fears and concerns can be addressed. Rehabilitation staff should be sensitive to caregivers and spouses because they are often receiving little support themselves. Particularly important are discussions and skill development activities focusing on how family members can provide support to the patient without promoting dependency. For the patient having significant interpersonal or family conflict, referral to a clinical social worker, psychologist, or other counselor for family or relationship counseling is recommended.

Smoking Cessation

2014 marks the 50th anniversary of the United States Surgeon General's report on Smoking and Health. New estimates state the annual burden of smoking-attributable mortality in the United States is 480,000 people. Millions more live with smoking-related diseases, and more than 20 million premature deaths are attributable to smoking and second-hand smoke (33). Tobacco use and dependence are chronic disorders in which repeated cessation attempts and sporadic relapses are common. In the Lung Health Study, smoking cessation was associated with a 32% reduction in all-cause mortality at 5 years of follow-up, with the trend persisting over more than 14 years of further follow-up. Sustained quitters had a total mortality rate that was 42% lower than continued smokers. Intermittent quitters/smokers had a 30% lower mortality rate than that of continued smokers. Smoking cessation decreased cardiovascular disease

mortality by 45% (34). Clinicians in pulmonary rehabilitation play a key role in motivating patients to quit and can assist them with proven methods to facilitate long-term successful cessation.

Nicotine dependence is often tied to the psychoactive impact of nicotine. Smoking stimulates neurochemical pathways associated with cognitive stimulation, memory, pleasure, mood control, anxiety reduction, relaxation, and appetite suppression. The pleasurable effects of smoking are reinforced by the conditioned response associated with environmental triggers, including alcohol use and social interaction. Conversely, nicotine withdrawal is associated with anxiety, restlessness, irritability, impaired concentration, depressed mood, insomnia, headache, increased appetite, and weight gain. Although nicotine as a compound has little danger beyond dependence, tobacco addiction is profoundly dangerous. The focus of pharmacological and behavioral management of nicotine dependence is to decrease withdrawal symptoms and promote behaviors linked with successful long-term cessation, which, when combined, improve chances of successful cessation in all populations.

A combination of behavioral and pharmacological treatments is recommended for optimal management of nicotine dependence and improved quit rates. Fiore et al. (35) in 2008 outlined five key points to enhance motivation to quit tobacco use:

Relevance: why is quitting personally relevant

Risks: potential negative consequences of tobacco use, including acute, long-term and environmental risks posed to others around the currently-smoking patient.

Rewards: potential benefits of stopping tobacco use

Roadblocks: barriers or impediments to quitting and provide treatment to address barriers

Repetition: motivational interview should be repeated every time an unmotivated patient visits the clinic setting.

Pharmacological Strategies

Approved first-line pharmacological management for nicotine dependence includes nicotine replacement, bupropion (Zyban, Wellbutrin, GlaxoSmithKline, London, UK), and varenicline (Chantix, Pfizer, New York City, USA). Nicotine replacement therapy (NRT) is available in patch, lozenge, and gum form without a prescription; in addition, it is available as a nasal spray and oral inhaler with a prescription. NRT is normally begun on the identified quit date and tapered down in use over two to three months. NRT is considered generally safe in persons with known cardiovascular

Table 5. Pharmacologic interventions to assist with smoking cessation.					
Method of quitting	Route	Dosage	Amount of nicotine provided	Potential side effects (talk to MD for full list of side effects, if side effects don't go away)	Safety/usage warnings
First line drugs					
Bupropion (sustained release) Zyban; (GlaxoSmithKline, London, UK)	Oral	Per MD, although typically 150 mg daily for three days, 150 mg twice daily for 7-12 weeks release	None: thought to reduce cravings by enhancing central nervous system noradrenergic and dopaminergic	Drowsiness, anxiety, difficulty falling/ staying asleep, dry mouth	Call MD with symptoms of depression/ suicidal ideation/ changes in behavior
Varenicline (Chantix, Pfizer, New York City, USA)	Oral	Per MD, although typically titrated from 0.5 mg daily for 3 days to 0.5 mg twice daily for 3 days to 1 mg twice daily	None: binds to and partially stimulates nicotine receptors. Decreases both nicotine withdrawal symptoms and rewarding sensations of cigarette smoking	Nausea, constipation, gas, vomiting, heartburn, changes in appetite	Call MD with symptoms of depression/ suicidal ideation/ changes in behavior
Nicotine replacement					
Nicotine Patch (generic)	Transdermal, extended release over 24 hours. Applied daily to non-hairy skin	<10 cigarettes daily: 7-14 mg patch >10 daily: 21 mg Tapered down over 8 weeks	7-21 mg daily	Insomnia, vivid dreams, dizziness, headache	Rotate sites to avoid irritation, may remove patch at bedtime
Nicotine Gum (generic)	Absorbed through oral mucosa via chewing gum, peak serum levels reached in 20 minutes	<25 cigarettes daily: 4 mg gum >25 cigarettes daily: 2 mg	2-4 mg per dose	Dizziness, nausea, vomiting, diarrhea, irregular heartbeat, mouth blisters	Chew until flavor is tasted, then park between cheek and gums for 30 minutes
Nicotine Lozenge (generic)	Absorbed through oral mucosa, dissolves over 30 minutes	Smoke within 30 minutes of waking: 4 mg 1-2 lozenges used per hour for 6 weeks, tapered down for 6 weeks	4 mg×9+daily 20 lozenges daily max	Hiccups, heartburn, nausea, sore throat	Park between cheek and gums until dissolved
Nicotine Inhaler (generic)	Inhaled by mouth	Puffing one cartridge over 20 minutes	No more than 16 cartridges per day	Mouth/throat irritation, cough, runny nose, taste changes	Keep cartridges out of reach of children/pets
Nicotine nasal spray (generic)	Absorbed through nasal mucosa	2 sprays, 1 for each nostril: 1 dose	No more than 40 doses per day	Hot/peppery feeling in back of nose/throat, runny nose, throat irritation, watery eyes, sneezing/coughing	Side effects usually go away in a few days

Second-line drugs					
Nortriptyline (Pamelor; Novartis, Basel, Switzerland)	Oral: capsule and oral liquid	Per MD	none	Nausea, drowsiness, weakness, anxiety, dry mouth, changes in appetite, constipation, urination changes, blurred vision, Serious side effects include: slow/difficult speech, jaw/neck/back spasms	Call prescribing doctor if side effects are severe, don't go away, or if you experience any listed on the "warning" section of the drug information given with packaging.
Clonidine (generic)	Oral, transdermal patch	Per MD	none	Dry mouth, tiredness, weakness, headache, nervousness, nausea, vomiting, constipation May cause allergic reaction: rashes, hives, swelling of face, throat, tongue, lips, eyes, hands, feet, ankles, legs.	Call prescribing doctor if side effects are severe, don't go away, or if you experience any listed on the "warning" section of the drug information given with packaging.

disease. Acidic beverages such as coffee, juices, and soft drinks decrease oral nicotine absorption and should be avoided for 15 minutes before and during use of nicotine gum, lozenges, and inhalers. Patient preference, affordability, and medical considerations should dictate pharmacological therapy. Table 5 lists pharmacological methods to aid in smoking cessation. The lists of side effects and warnings are not exhaustive, always consult the product packaging and pharmacist for a full list of contraindicated medications, side effects, warnings and appropriate uses.

Patient Counseling

Nonpharmacological approaches include individual counseling and self-help materials. Effective counseling includes cognitive behavioral strategies such as self-monitoring, gradual reduction in smoking in anticipation of an established quit date, and relapse prevention strategies. Counseling helps patients understand their personal barriers to quitting and use social support for successful cessation. Motivational interviewing (34) uses empathy, open discussions about positive and negative aspects of smoking, a menu of cessation techniques, and discussions of patient goals and how smoking is inconsistent with these goals. The patients are offered alternatives and options for managing cravings, such as distraction, deep breathing, postponing smoking and rethinking the need to smoke, and calling a supportive person. Toll-free numbers are available for counseling, including 1-800-QUIT-NOW in the United States. The persons

concerned are encouraged about increased hunger to use oral substitutes for cigarettes such as gum, cinnamon sticks, sugar-free hard candy, toothpicks, water, and low-calorie drinks. Symptoms of irritability may improve with a walk, a bath, or a pleasurable activity. Patients should be encouraged to reward their successes with a healthy treat.

Critical factors for smoking cessation include a patient's desire to quit as well as skills and assistance to quit. A framework for healthcare providers to help patients stop smoking also comes from Fiore 2008 (35)

Ask: identify all tobacco users at every visit

Advise: deliver a clear, strong, and personalized message: "As your [doctor, physical therapist, nurse], I need you to know that quitting smoking is the most important thing you can do to protect your health now and in the future. Smoking will make your lung disease worse. I will help you with quitting. It is important that you quit smoking now. Occasional or light smoking is still dangerous"

Assess: Determine the patient's willingness to quit. "Are you willing to try to quit?"

Assist: Provide counseling, medication. Help the patient to develop a quit plan and set a quit date. The patient should discuss his plan with family and friends and ask for understanding and support. Challenges should be anticipated, particularly in the initial phase during withdrawal symptoms. Instruct patients to remove tobacco products from his environment. Recommend approved medications, except when contraindicated or when there is insufficient evidence

of effectiveness, such as in the case for pregnant women, smokeless tobacco users, light smokers, and adolescents. Evaluate factors that have helped and hindered past attempts at quitting should, and build on past successes. Discuss challenges and triggers and how to successfully overcome them. Alcohol is associated with relapse, and the patient should consider not drinking or limiting alcohol while quitting. Quitting is more difficult when there is another smoker in the household. Other smokers at home should be encouraged to quit or advised not to smoke around the patient. Provide the patient with ongoing support, including written information from the national quit phone line network in the United States (1-800-QUIT-NOW) and other organizations. Materials should be appropriate for the patient's culture, race, education, and age. Practical counseling including problem solving and skills training should be provided. Strive for total abstinence.

Arrange: Ensure follow-up contact. Follow-up contact should begin soon after the quit date, preferably during the first week. A second follow-up contact is recommended within the first month. Identify concerns encountered, and anticipate future challenges. Assess medication use and problems. Congratulate nonsmokers on their success. If the patient is smoking, review the circumstances of relapse and work with the patient on complete cessation and consider the use of more intensive treatment that may be appropriate.

If the patient has little or no interest in quitting, asking what the person likes and dislikes about smoking may help the clinician to understand his/her perspective and the patient to consider possible negative aspects of smoking.

Intensive behavioral interventions are the most effective. Adjunct strategies include recommending exercise, proper nutrition, and spiritual support for those who express interest. Those who struggle with persistent smoking despite use of guidelines strategies may benefit from referral to a nicotine-dependence specialist.

Summary

A strong, trusting bond must be established with patients early in pulmonary rehabilitation to ensure successful outcomes. Assessment for psychosocial issues should be routinely performed at the outset of pulmonary rehabilitation. Simple screening questions (PRIME-MD) can be used to assess for anxiety and depression. For patients who may have cognitive impairment, the Mini-Mental State Examination is an appropriate screening evaluation. Patients experienc-

ing substantial impairments in psychological functioning should be referred to a mental health provider for further evaluation and treatment. Intervention for psychosocial problems of lesser degrees should be integrated into the comprehensive pulmonary rehabilitation treatment plan. Psychosocial interventions, offered in either individual or group formats, can be effective in decreasing distress and facilitating adaptive coping. Breathing retraining, relaxation training, and stress management training can also be beneficial in reducing anxiety and the dyspnea cycle; those interventions should be an integral part of the overall treatment plan.

A combination of behavioral and pharmacological approaches is recommended to maximize success with long-term smoking cessation. Reassessment of psychological status and refinement of interventions are helpful in formulating a post-rehabilitation plan. Fostering those activities that promote and reinforce the strategies learned will be useful in the long-term maintenance of physiological and psychosocial gains.

REFERENCES

1. Adler RH. Engel's biopsychosocial model is still relevant today *J Psychosom Res.* 2009;67:607-611. [\[CrossRef\]](#)
2. Singh SJ, ZuWallack RL, Garvey C, et al. Learn from the past and create the future: the 2013 ATS/ERS statement on pulmonary rehabilitation. *American Thoracic Society/ European Respiratory Society Task Force on Pulmonary Rehabilitation.* *Eur Respir J* 2013;42:1169-74. [\[CrossRef\]](#)
3. Fan VS, Meek PM. Anxiety, depression, and cognitive impairment in patients with chronic respiratory disease. *Clin Chest Med.* 2014;35:399-409. [\[CrossRef\]](#)
4. Lacasse Y, Rousseau L, Maltais F. Prevalence of depressive symptoms and depression in patients with severe oxygen dependent chronic obstructive pulmonary disease. *J Cardiopulm Rehabil* 2001;21:80-6. [\[CrossRef\]](#)
5. Ryerson CJ, Berkeley J, Carrieri-Kohlman VL, et al. Depression and functional status are strongly associated with dyspnea in interstitial lung disease. *Chest* 2011;139:609-16. [\[CrossRef\]](#)
6. Lahousse L, Vernooij MW, Darweesh SK, et al. Chronic obstructive pulmonary disease and cerebral microbleeds. The Rotterdam Study. *Am J Respir Crit Care Med* 2013;188:783-8. [\[CrossRef\]](#)
7. Dal Negro RW, Bonadiman L, Tognella S, et al. Extent and prevalence of cognitive dysfunction in chronic obstructive pulmonary disease, chronic non-obstructive bronchitis, and in asymptomatic smokers, compared to normal reference values. *Int J Chron Obstruct Pulmon Dis* 2014;9:675-83. [\[CrossRef\]](#)
8. Kunik ME, Veazey C, Cully JA, et al. COPD education and cognitive behavioral therapy group treatment for clinically significant symptoms of depression and anxiety in COPD patients: a randomized controlled trial. *Psychol Med* 2008;38:385-96. [\[CrossRef\]](#)

9. Incalzi RA, Corsonello A, Trojano O, et al. Cognitive training is ineffective in hypoxemic COPD: a six-month randomized controlled trial. *Rejuvenation Research* 2008;11:239-250. [\[CrossRef\]](#)
10. Incalzi AR, Corsonello A, et al. Drawing impairment predicts mortality in severe COPD. *Chest* 2006;130:1687-94. [\[CrossRef\]](#)
11. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders (5th ed.)*. Arlington, VA: American Psychiatric Publishing, 2013;160-230.
12. Kunik ME, Azzam PN, Soucek J, et al. A practical screening tool for anxiety and depression in patients with chronic breathing disorders. *Psychosomatics* 2007;48:16-21. [\[CrossRef\]](#)
13. Kunik ME, Roundy K, Veazey C, et al. Surprisingly high prevalence of anxiety and depression in chronic breathing disorders. *Chest* 2005;127:1205-11. [\[CrossRef\]](#)
14. Schwarzbach M, Luppia M, Hansen H, et al. A comparison of GP and GDS diagnosis of depression in late life among multimorbid patients - Results of the MultiCare study. *J Affect Disord* 2014;168:276-83. [\[CrossRef\]](#)
15. Eaton WW, Muntaner C, Smith C, et al. Center for Epidemiologic Studies Depression Scale: Review and revision (CESD and CESD-R). In: Maruish ME, ed. *The Use of Psychological Testing for Treatment Planning and Outcomes Assessment*. 3rd ed. Mahwah, NJ: Lawrence Erlbaum, 2004:363-77.
16. Kapfhammer HP. The relationship between depression, anxiety and heart disease - a psychosomatic challenge. *Psychiatr Danub* 2011;23:412-24.
17. Barrera TL, Grubbs KM, Kunik ME, et al. A review of cognitive behavioral therapy for panic disorder in patients with chronic obstructive pulmonary disease: the rationale for interoceptive exposure. *J Clin Psychol Med Settings* 2014;21:144-54. [\[CrossRef\]](#)
18. Dear BF, Titov N, Sunderland M, et al. Psychometric comparison of the generalized anxiety disorder scale-7 and the Penn State Worry Questionnaire for measuring response during treatment of generalised anxiety disorder. *Cogn Behav Ther* 2011;40:216-27. [\[CrossRef\]](#)
19. Topper M, Emmelkamp PM, Watkins E, et al. Development and assessment of brief versions of the Penn State Worry Questionnaire and the Ruminative Response Scale. *Br J Clin Psychol* 2014;53:402-21. [\[CrossRef\]](#)
20. Wuthrich VM, Johnco C, Knight A. Comparison of the Penn State Worry Questionnaire (PSWQ) and abbreviated version (PSWQ-A) in a clinical and non-clinical population of older adults. *J Anxiety Disord* 2014; 28: 657-63. [\[CrossRef\]](#)
21. Verrill D, Barton C, Beasley W, et al. The effects of short-term and long-term pulmonary rehabilitation on functional capacity, perceived dyspnea, and quality of life. *Chest* 2005;128:673-83. [\[CrossRef\]](#)
22. Li J, Huang Y, Fei GH. The evaluation of cognitive impairment and relevant factors in patients with chronic obstructive pulmonary disease. *Respiration* 2013;85:98-105. [\[CrossRef\]](#)
23. Martinez CH1, Richardson CR, Han MK, et al. Chronic Obstructive Pulmonary Disease, cognitive impairment and development of disability: The Health and Retirement Study. *Ann Am Thorac Soc* 2014 [Epub ahead of print].
24. Singh B, Parsaik AK, Mielke MM, et al. Chronic obstructive pulmonary disease and association with mild cognitive impairment: the Mayo Clinic Study of Aging. *Mayo Clinic Proceedings* 2013; 88:p1222. [\[CrossRef\]](#)
25. Nasreddine ZS, Phillips NA, Bédirian V, et al. The Montreal Cognitive Assessment (MoCA): A Brief Screening Tool For Mild Cognitive Impairment. *J Am Geriatr Soc* 2005; 53:695-9. [\[CrossRef\]](#)
26. Minkin A, Snider-Meyer J, Olson D, et al. Effectiveness of a Motivational Interviewing Intervention on Medication Compliance. *Home Healthc Nurse* 2014;32:490-6. [\[CrossRef\]](#)
27. Lim G, Park I, Park S, et al. Effectiveness of smoking cessation using motivational interviewing in patients consulting a pulmonologist. *Tuberc Respir Dis (Seoul)* 2014;76:276-83. [\[CrossRef\]](#)
28. O'Halloran PD, Blackstock F, Shields N, et al. Motivational interviewing to increase physical activity in people with chronic -health conditions: a systematic review and meta-analysis. *Clin Rehabil* 2014. [\[CrossRef\]](#)
29. Bonsaksen T, Fageroen MS, Lerdal A. Factors associated with self-esteem in persons with morbid obesity and in persons with chronic obstructive pulmonary disease: A cross-sectional study. *Psychol Health Med* 2014;1-12. [Epub ahead of print]. [\[CrossRef\]](#)
30. Kozora E, Tran ZV, Make B. Neurobehavioral improvement after brief rehabilitation in patients with chronic obstructive pulmonary disease. *J Cardiopulm Rehabil* 2002;22:426-30. [\[CrossRef\]](#)
31. Harrison SL, Greening NJ, Williams JE, et al. Have we underestimated the efficacy of pulmonary rehabilitation in improving mood? *Respir Med* 2012;106:838-44. [\[CrossRef\]](#)
32. Hill K, Vogiatzis I, Burtin C. The importance of components of pulmonary rehabilitation, other than exercise training, in COPD. *Eur Respir Rev* 2013;22:405-13. [\[CrossRef\]](#)
33. Alber AJ, Shopland DR, Cummings KM. The 2014 Surgeon General's report: commemorating the 50th Anniversary of the 1964 Report of the Advisory Committee to the US Surgeon General and updating the evidence on the health consequences of cigarette smoking. *Am J Epidemiol* 2014;179:403-12. [\[CrossRef\]](#)
34. Anthonisen NR, Connett JE, Kiley JP, et al. Effects of smoking intervention and the use of an inhaled anticholinergic bronchodilator on the rate of decline of FEV1. *The Lung Health Study. JAMA* 1994; 272:1497-505. [\[CrossRef\]](#)
35. Fiore MC, Jaen CR, Baker TB, et al. *Treating Tobacco Use and Dependence: 2008 Update U.S. Public Health Service Clinical Practice Guideline Executive Summary*. *Respir Care* 2008;53:1217-22.