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Depressed mood predicts pulmonary rehabilitation completion among women, but not men

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Summary
Background: As many as 30% of patients who start pulmonary rehabilitation (PR) fail to complete it, and depressed mood has been associated with PR non-completion. Depression is more common in women than men with COPD and historically women with COPD have been under studied. However, no studies to date have investigated gender-specific predictors of PR completion.
Methods: The study included 111 patients with COPD who enrolled in a community based outpatient PR program in Providence, RI. Patients who attended 20 or more sessions were designated "completers". Depression was measured using the CES-D. Logistic regression models were evaluated to test depressed mood as a predictor of PR completion. Analyses controlled for demographic and health variables found to differ between completers and non-completers.
Results: Patients were 95% white and 49.5% women, and 74% had a GOLD stage $\geq$3. Sixty-eight percent of patients were PR completers. A logistic regression model, showed that lower depressed mood independently predicted PR completion across all patients (adjusted OR = 0.92, p = .002). In gender-stratified analyses, lower depressed mood was an independent predictor of PR completion for women (adjusted OR = .91, p = .024) but not men (adjusted OR = .97, p = .45). Greater 6-min walk test distance was also an independent

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predictor of PR completion among women.
Conclusion: Depressed mood is an important predictor of completion of community based PR among women. Screening and brief treatment of depression should be considered in practice.

Chronic obstructive pulmonary disease (COPD) is a common and often disabling inflammatory lung disease characterized by progressive airway obstruction that is not fully reversible [1,2]. An important component of non-pharmacologic treatment for COPD is multidisciplinary pulmonary rehabilitation (PR), which improves exercise tolerance, perceived dyspnea, depression and anxiety, and health-related quality of life [2–5]. The minimum recommended duration for PR is six weeks [2], with longer programs being more effective [6,7]. However, as many as 30% of patients who begin PR programs drop out prematurely [8–11].

Several studies have identified baseline variables that predict PR non-completion [11], including depressed mood. Depressive symptoms and Major Depressive Disorder are common among patients with COPD [12,13], and have been associated with increased mortality, greater symptom burden and increased hospitalization, decreased functioning, and diminished quality of life [13–19]. High rates of depression among those with COPD appear to be at least partially caused by the activity limitations due to COPD [20], which is similar to findings in other chronic illnesses [21].It is well-established that women in the general population experience higher rates of depression relative to men, and this gender difference has also been observed among those with COPD [13,22,23]. Women may also be more likely to become depressed after a COPD diagnosis and greater duration of COPD increases the risk of developing depression in women but not men [13].

Women have historically been woefully underrepresented in COPD research [24]. To our knowledge, no studies have evaluated predictors of PR completion separately for male and female PR attendees. Further, the only data on predictors of PR completion from US based samples have included a disproportionate percentage of men (61–96%) [25,26]. Therefore, the current study was designed to investigate gender specific predictors of completion of a comprehensive US community-based PR program, with a focus on investigating depressed mood. We hypothesized that depressed mood will be an independent predictor of PR completion in both genders after controlling for relevant covariates.

Method

This sample was drawn from patients attending a comprehensive outpatient PR program in Providence, RI. The PR treatment team includes an exercise physiologist, respiratory therapist, physical therapist, clinical psychologist, and MD pulmonologist. The PR program includes assessment, treatment, and education for patients with COPD and other respiratory disorders. The clinical psychologist (MLB) conducted an in person evaluation with PR patients at intake. If patients reported significant illness adjustment issues, stress, depressed mood, or anxiety, they were offered brief psychotherapy. In general psychotherapy focused on pulmonary specific adjustment issues, such as a) accepting functional limitations, b) adherence to medications and oxygen use, c) pacing of activities and prioritizing most important activities, and d) not judging self-worth based on the quantity of tasks performed. Cognitive behavioral interventions were provided as needed to treat depression and anxiety symptoms.

Patients are expected to attend this PR program twice a week for 20–36 total sessions. Because the number of PR sessions pre-approved by local insurance providers ranged from 20 to 36 sessions and because at the time of data collection Medicare capped PR attendance at 36 *lifetime* sessions, it was program policy to consider planned discharge after 20 sessions (in the case of Medicare coverage, so that patients could save some lifetime sessions for future exacerbations). These planned discharge decisions also incorporated patient progress (especially progress towards patient functional goals) and ability to exercise independently following discharge. All patients in our sample described below were pre-approved by their public or private insurance company at PR intake for at least 20 sessions. Therefore, for the current study, patients who attended 20 or more sessions were designated as *completers* and those who attended fewer than 20 sessions as *non-completers*.

Participants

Data were obtained by combining an existing quality improvement database (which included all standardized intake measures listed below) and a retrospective chart review (to confirm diagnostic/co-morbidity status and collect demographic and attendance data) of patients enrolled in the PR program. All patients meeting formal COPD criteria (i.e., $FEV_1/FVC <$) and enrolled in the program between October 2007 and February 2012 were reviewed for inclusion.

We first identified patients that would likely have a diagnosis of COPD (i.e., those with a ICD-9 diagnostic code indicating a chronic airway obstruction) and who had valid scores on all of our primary standardized measures (i.e., complete data at intake on the CES-D, all 4 subscales of the Chronic Respiratory Questionnaire (CRQ) [27] the 6-min walk test, and an FEV-1 test) in the existing quality improvement database. This produced 146 patients whose charts were selected for review. Of these 146 patients, medical charts from 17 were unavailable for review. A total of 129 charts were reviewed. Of these 129 patients, medical charts indicated that 18 patients had a FEV_1/FVC ratio >0.7, indicating they did not meet formal criteria for COPD

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