

# Dyspnea Self-Management in Patients With Chronic Obstructive Pulmonary Disease: Moderating Effects of Depressed Mood

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*The effects of three versions of a dyspnea self-management program on depressed mood and the moderating effects of baseline depression risk on improvements in dyspnea severity, exercise performance, and physical and social functioning were examined over a 2-month period in 100 patients with moderate to severe chronic obstructive pulmonary disease (COPD). All three versions of the dyspnea self-management programs, which differed in the amount of supervised exercise (no sessions or four or 24 sessions), equally and significantly improved depressed mood. Subjects at high risk for depression at study entry who received 24 sessions had greater reduction in dyspnea than those who received four sessions or no sessions. Patients with COPD at high risk for depression are likely to achieve greater relief of dyspnea with self-management programs that include more intensive supervised exercise.*

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Depression is a commonly reported emotional problem associated with chronic obstructive pulmonary disease (COPD); the prevalence of depression in COPD patients has been estimated to range from 25% to 74%.<sup>1,2</sup> The wide range in estimated prevalence is primarily due to differences in the demographic characteristics of the study samples, measurement properties of instruments, and cut-off values used to define depression.<sup>3</sup> Nonetheless, the finding that COPD patients are at high risk for depression is consistent. The disease likely serves as an antecedent that increases the level of mediating variables such as depression and dyspnea, which, in turn, diminish functional status

and quality of life.<sup>4,5</sup> It is important to note that most of the studies of depression that are cited in this article are based on psychological questionnaires rather than clinical diagnoses, unless otherwise stated.

In one case-control study, van Manen et al.<sup>1</sup> found the risk for depression to be 2.5 times greater for patients with severe COPD (forced expiratory volume in 1 second [FEV<sub>1</sub>] < 50% predicted) than for comparison subjects with similar demographic characteristics. Greater severity of depression in patients with COPD has been associated with diminished health-related quality of life,<sup>6–9</sup> diminished functional status,<sup>10</sup> impaired coping,<sup>11</sup> greater COPD symptoms,<sup>1,9,12–14</sup> and failure of treatment for COPD exacerbations.<sup>15</sup> Mortality risk was three times greater for patients who had depressive symptoms during hospitalization for COPD exacerbations, compared to those who did not have depressive symptoms.<sup>16</sup> Compared to patients with other chronic illnesses, such as heart failure, arthritis, angina, and diabetes, patients with COPD have been found to have worse psychological functioning.<sup>17</sup>

Depressed mood and/or depression have been mea-

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sured as an outcome of multipronged treatments such as pulmonary rehabilitation or self-management interventions, both of which typically include some form of exercise. Some<sup>18–22</sup> but not all<sup>23,24</sup> of these studies have demonstrated a positive effect on depression. Exercise is often implicated as the active ingredient in modifying depressed mood in these investigations; however, the granular effects (i.e., dose frequency, duration, and intensity) of exercise in improving depressed mood have not been examined sufficiently in healthy people and not at all in patients with COPD.<sup>25</sup> In addition, few studies have assessed the moderating effects of depressed mood on changes in health outcomes from such treatments in patients with COPD.

We previously reported the main results from an experimental study evaluating three dyspnea self-management (DM) programs, two of which included additive doses of supervised exercise in addition to a standard program of individualized education and home-based walking for patients with COPD.<sup>26</sup> We found that the effect on dyspnea severity, exercise performance, and health-related quality of life was largely dependent on the “dose” of supervised exercise (no, four, or 24 sessions) in that subjects who received the extended training outperformed the other two groups. In this article, we report on the effects of the three DM programs on depressed mood and present subgroup analyses of the moderating effects of baseline depression risk on improvement in the primary study outcome variables of dyspnea severity, exercise performance, and social and physical functioning.

## METHOD

### Design

The data used for this secondary analysis are from a randomized clinical trial of the three DM programs. The study methods have been reported in-depth elsewhere<sup>26</sup> and are therefore described only briefly in this article. After baseline testing, subjects were randomly assigned to one of three treatment groups (DM, DM plus four supervised exercise sessions, or DM plus 24 supervised exercise sessions; see “Interventions” later in this section). Outcomes were measured at baseline and at 2 months. Of the 115 subjects who were randomly assigned to study groups, 12 dropped out for various reasons, including illness, disinterest, and transportation problems, leaving 103 subjects who completed the 2-month evaluation. The study protocol was approved by the institutional review board, and each subject gave informed written consent.

### Subjects

Subjects were recruited by advertisements and referrals from numerous sources, including physicians’ offices and Better Breathers Clubs of the American Lung Association. Entry criteria were age >40 years, confirmation of a diagnosis of moderate to severe COPD (i.e., FEV<sub>1</sub> <60% of the predicted level or a ratio of FEV<sub>1</sub> to forced vital capacity <60%) with clinical stability for at least 1 month, no participation in formal exercise training or pulmonary rehabilitation in the previous year, and absence of other active symptomatic diseases that would interfere with exercise (e.g., cancer, coronary artery disease, heart failure, psychiatric illness).

*Interventions* The basic DM program included three components: individual education and demonstration of strategies for self-management of dyspnea, an individualized home-based walking prescription, and exercise self-monitoring that included use of a pedometer and exercise log (see Appendix 1 for more details).

Subjects in the group who received DM plus four supervised exercise sessions received the basic DM program plus a total of four nurse-supervised treadmill exercise sessions once every other week for 2 months. The goal of the exercise sessions was steady-state symptom-limited exercise consisting of continuous walking for as long as 30 minutes at the endurance treadmill test workload.

Subjects in the group who received DM plus 24 supervised exercise sessions received the basic DM program plus 24 nurse-supervised treadmill exercise sessions three times per week over 2 months. The exercise sessions were identical to those received by the subjects who received four supervised exercise sessions.

### Pulmonary Function Testing

Subjects performed spirometry 15–30 minutes after receiving two puffs of albuterol administered by means of a spacer (Aerochamber; Monaghan, Plattsburg, N.Y.). Spirometry was performed with a 10-liter water-seal spirometer (Collins Medical, Braintree, Mass.) according to American Thoracic Society criteria.<sup>27</sup> Baseline lung volumes (helium dilution method), maximum voluntary ventilation, single-breath diffusion capacity for carbon monoxide, and residual volume over total lung capacity were measured by using a body plethysmograph (Collins Plus Body Plethysmography System; Collins Medical, Braintree, Mass.).

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