THE IMPACT OF SOCIAL SUPPORT IN PULMONARY REHABILITATION OF PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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ABSTRACT

Social support has been shown to be an important mediator of health status and survival in chronic illness, but little information is available in patients with lung diseases. We used the Social Support Questionnaire (SSQ) to examine the relationships of number of persons (SSQ-N) and satisfaction (SSQ-S) with other measures of health status, treatment changes, and survival in 110 patients with chronic obstructive pulmonary disease (COPD) participating in a randomized, controlled clinical trial of pulmonary rehabilitation (PR). Included in the analyses were measures of lung function (FEV\(_1\)), exercise tolerance (maximum and endurance), symptoms ratings, age, self-efficacy, depression, and gender. At baseline, SSQ-N and SSQ-S were correlated positively with self-efficacy and negatively with depression and self-reported shortness of breath (SOB). SSQ-N was also correlated with disease severity and maximum exercise tolerance (FEV\(_{1.0}\) and VO\(_2\) max). Using the Cox Proportional Hazard Model, SSQ-S was significantly related to improved survival up to six years. However, in multivariate analysis, after adjusting for FEV\(_{1.0}\) and SOB which were better predictors of survival, SSQ-S was marginally significant. SSQ-S and survival were computed separately for males and females across treatment groups. SSQ-S was significantly related to mortality for women but not for men. We conclude that social support is related to measures of physical and psychological function in patients with COPD and may influence improvement and survival after pulmonary rehabilitation.


INTRODUCTION

The impact of social support on psychological and physical health has gained increasing attention in medical and behavioral research and practice (1). Results of studies examining the possible relationship between social support and onset of illness are inconsistent. However, there is substantial evidence suggesting that social support is protective in the presence of chronic disease (2).

Although there are various ways to conceptualize social support, most fall into two main categories—quantitative and qualitative (3). Social support is typically defined as the number of individuals in a person’s network who are perceived as caring and dependable. Several authors have emphasized the importance of considering the social support network size and satisfaction as separate constructs (4–6). Previous studies substantiate the impact of social support on patients with chronic illness in modifying social stressors (7,8) and encouraging health-promoting behaviors that may affect survival and other health outcomes (9,10). Studies on chronic illness and social support center around the stress buffering model of support, in which chronic illness is characterized as a chronic stress situation and support is thought to modify the deleterious effects of illness (11).

Interactions between social support and morbidity and mortality have been studied in several chronic disease populations, including patients with cancer (11), heart disease (12), diabetes (13), end stage renal disease (14), and arthritis (15,16). Positive relationships have been observed between increased social support and reduction of the stresses of chronic illness, adherence and compliance to medical treatment, and lower morbidity and mortality (17,18). However, there have been no studies examining social support in adult pulmonary disease populations.

The societal impact of chronic obstructive pulmonary disease (COPD) is significant. COPD is a major cause of morbidity and mortality. In the United States, it is currently the fourth leading cause of death and is present in approximately 10% of the older adult population. Chronic illnesses like COPD produce major life stresses that require physical and psychological adjustments. They often disrupt social relationships, increase isolation, and place enormous burdens on social networks and health care providers. For these individuals, social support may be a valuable resource for coping.

In this study, we examined the relationship of social support to morbidity and mortality in a group of patients with chronic obstructive pulmonary disease participating in a clinical trial of pulmonary rehabilitation. We hypothesized that social support would be related to measures of health outcome.
METHODS

Subjects

The subjects included in this analysis were 110 of 119 patients with COPD who participated in a randomized clinical trial of pulmonary rehabilitation. Methods and preliminary results of this clinical trial have been reported previously (19). The nine patients excluded did not complete the social support questionnaire. All subjects met the following entry criteria: (a) clinical diagnosis of COPD confirmed by history, physical examination, spirometry, and chest roentgenogram; (b) no other significant lung disease; (c) clinically stable on an acceptable medical regimen; and (d) no unstable cardiac or other disease that would limit participation in the rehabilitation program.

Assessment

Each subject underwent comprehensive pulmonary function and exercise tests and completed psychosocial questionnaires at baseline, after the interventions, and at follow-up assessments for up to six years.

Pulmonary function was evaluated using comprehensive tests following standard methods (20,21). For this analysis, we utilized FEV\textsubscript{1.0}, an important measure of disease severity in COPD and one that was identified in a previous factor analysis as representative of airflow obstruction in these subjects (22).

Exercise performance was evaluated with tests of both maximal exercise tolerance and endurance. Maximal exercise tolerance was measured with a symptom-limited exercise test to the highest tolerable level on a treadmill. In this incremental exercise test, the treadmill speed was increased at one-minute intervals by 0.5 miles per hour up to 3.0 miles per hour with further work increments made by increasing elevation by 2% each minute. During the exercise test, expired gases were analyzed to measure oxygen uptake (VO\textsubscript{2}) and other related variables (23). Maximum VO\textsubscript{2} (VO\textsubscript{2} max) is a standard measure of maximal exercise tolerance. An electrocardiogram was used to measure heart rate and monitor for arrhythmias or cardiac ischemia. Perceived symptoms of breathlessness and muscle fatigue were rated at the end of the exercise test using a scale adapted from Borg (24).

Exercise endurance was measured on a separate day. This test was performed at a constant work level chosen from the initial maximum exercise test to estimate each subject’s symptom-limited capacity for steady-state walking (25). On average, the target exercise level represented 95% of initial maximal work load. Patients were instructed to walk up to 20 minutes at this level and, if possible, for an additional 10 minutes at a higher level. Measurements were made of the total time at the target levels on the treadmill (maximum = 30 minutes); perceived symptom ratings of breathlessness and muscle fatigue were obtained at the end of the exercise test using the modified Borg scale.

Psychosocial questionnaires completed at baseline and used in this analysis included the following:

Social Support: The Social Support Questionnaire (SSQ) (26) measures the number of persons in the social support network (SSQ-N) and self-perception of satisfaction with the available support (SSQ-S). The original SSQ questionnaire has 27 self-administered items. In the first section, patients are requested to list individuals on whom they depend in a variety of situations. In the second section, the subjects rate their satisfaction with their support network on a six-point scale. For this study, we used a modified twelve-item version of the SSQ. The short form of the SSQ has been shown to correlate well with the original version (27). The SSQ yields two scores: SSQ-N, reflecting the mean number of persons listed across the items; and SSQ-S, reflecting the mean satisfaction rating across all items. When compared with 23 other social support scales, the SSQ has been found to have a strong record of reliability and validity (28,29). In studies using over 200 subjects, alpha reliability has been reported at 0.94 and above.

Self-Efficacy: The self-efficacy questionnaire for this study was adapted from a previous version used by by Kaplan, Atkins, and Reinsch (30). The subscale used in this analysis emphasizes walking and includes the following statements: walk one block (approximately 5 minutes), walk two blocks (10 minutes), walk three blocks (15 minutes) . . . walk three miles (90 minutes). The subject rates the degree of confidence or strength of expectation to perform that activity on a 100-point probability scale, ranging in 10-point intervals from 0 (complete uncertainty) to 100 (complete certainty). The self-efficacy score reflects the highest walking level for which the patient expressed 100% confidence.

Well Being: The Quality of Well Being Scale (QWB) is a comprehensive measure of health-related quality-of-life that includes several components. First, it obtains observable levels of functioning at a point in time. The levels of functioning are obtained from three separate scales: mobility, physical activity, and social activity. Second, symptoms or problems are selected from a standard, comprehensive list, and the most undesirable symptom is noted. Then, the level of function and symptom reports are weighted by preference or the desirability of the state on a scale ranging from 0 (dead) to 1.0 (optimum function). The weights are standard ones, obtained from independent samples of judges who rate the desirability of the observable health status and symptom problem combination. This system has been used extensively in medical and health services research applications (31). In addition, specific validity and reliability studies using this measure for patients with COPD have been published (32). These studies demonstrate that the QWB scale is sensitive to relatively minor changes in health status and that it is correlated with a variety of physical and functional measures of health.

Depression: The Centers for Epidemiologic Studies Depression Scale (CES-D) is a general measure of depressive symptoms that has been used extensively in epidemiologic studies (33). The scale includes 20 items and measures dimensions of depressed mood, feelings of guilt and worthlessness, appetite loss, sleep disturbance, and fatigue. These items are assumed to be representative of the major components of depressive symptomatology. The CES-D has demonstrated high internal consistency. The alpha coefficients ranged from 0.84 to 0.90. Since the scale was devised to measure current depressive symptoms, test–retest reliability decreased as time increased between repeat administrations of the scale. Nevertheless, correlations were in the range of 0.45 to 0.70, which are values similar to those reported for other depression scales (34).

The CES-D was designed for assessing non-psychiatric populations (35). Although several studies have demonstrated that the CES-D is associated with clinical diagnosis of depression, it has been found to be better as a screening instrument than as a diagnostic tool. Scores on the CES-D scale of less than 16 are highly associated with clinical judgments of non-