

One session cognitive behavioural therapy for elderly patients with chronic obstructive pulmonary disease

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ABSTRACT

Background. We hypothesized that compared to an educational intervention, a single 2 h session of cognitive behavioural therapy (CBT), with 6-week follow-up, would reduce anxiety and depression, improve physical and mental functioning, and lead to a better quality of life and greater satisfaction with treatment in older patients with chronic obstructive pulmonary disease (COPD).

Methods. Fifty-six subjects were recruited from a large, urban, academically affiliated Veterans Affairs (VA) Hospital, a non-profit private hospital, and a local newspaper, for a single blind randomized controlled clinical trial. One 2 h session of group CBT was designed to reduce symptoms of anxiety, with specific components including relaxation training, cognitive interventions, and graduated practice, followed by homework and weekly calls for 6 weeks. This was compared to a group that received 2 h of COPD education, followed by weekly calls. Pre- and post-intervention subjects in both groups were administered SF-36, Geriatric Depression Scale, Beck Anxiety Inventory, 6 min walk test, and the FEV-1. Following the intervention, both groups completed the Client Satisfaction Questionnaire.

Results. When compared with a group that received education about COPD, 2 h CBT group showed decreased depression and anxiety. Contrary to our hypothesis, despite the decrease in depression and anxiety, there was no change in the physical functioning of the patients.

Conclusions. Twenty to 40% of patients with COPD have high levels of anxiety and depression. Our study finds that as little as 2 h of CBT administered in a group setting is able to reduce these anxious and depressive symptoms.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is the fourth leading cause of mortality in the United States. Its prevalence in those over age 64 is 34.1 per 1000 persons, almost three times that of those 45–64 years old (National Center for Health Statistics, 1982–1995). Compared with

healthy age-matched controls, the emotional, social and physical quality of life of patients with COPD is significantly impaired (Kaptein *et al.* 1993; Anderson, 1995). Although lung function testing poorly predicts quality of life, emotional status is among the most commonly reported determinants of quality of life (McSweeney *et al.* 1982; Yohannes *et al.* 1998). About 40% of COPD patients in general medical practice have depressive disorders, compared with 13% of all patients in general medical practice (Yohannes *et al.* 1998). Some

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researchers have found the prevalence of panic and generalized anxiety disorders in COPD patients to be greater than 20% and 30%, respectively, much higher than the expected 3% and 15% lifetime prevalence in the general population (Gift & McCrone, 1993; Wingate & Hansen-Flaschen, 1997). In a cross-sectional study of elderly veteran out-patients ($N = 43$) with COPD, we found 26% had moderate to severe anxiety, 12% had moderate to severe symptoms of depression and 28% had scores reflecting either moderate to severe anxiety or depressive symptoms (Kim *et al.* 2000).

Several small studies indicate that pharmacological therapy of depression or anxiety in COPD patients improves functional capacity and well-being (Borson *et al.* 1992; Argyropoulou *et al.* 1993; Smoller & Otto, 1998). In the elderly, however, polypharmacy and medication side effects are common (e.g. increased risk for falls, orthostatic hypotension, etc.). Alternatives to psychotropic medications are therefore needed.

Cognitive behavioural therapy (CBT) is a well-known approach for treating anxiety and depression, with significant empirical data available to support its efficacy in both arenas (Barlow 1988; Craighead *et al.* 1992). This model of psychosocial intervention seems particularly well-suited for older adults given its collaborative and problem-focused approach (Zeiss & Stefan, 1996; Knight & Satre, 1999) and data have demonstrated positive effects for older individuals with depression and anxiety (Scogin & McElreath, 1994; Stanley & Beck, 2000), as well as other psychiatric difficulties (Knight & Satre, 1999). Indeed, CBT has demonstrated effectiveness for improving exercise compliance in COPD patients (Atkins *et al.* 1984). Small pilot studies using cognitive behavioural approaches also have demonstrated effectiveness of CBT in improving mental health and functional status for patients with COPD. Using relaxation techniques administered over 12 weeks, 49 patients (mean age 50.5 years) with chronic respiratory conditions, primarily asthma, reported improved coping and decreased fear, asthma-specific complaints, asthma attacks, and sleep disturbance when compared with 37 control patients who received only asthma education (Sachs *et al.* 1993). Another 4 week relaxation study of 26 COPD patients

with dyspnoea found a decrease in anxiety and dyspnoea when compared with a placebo group (Gift *et al.* 1992). In a 6-week study of weekly 90-min session CBT (relaxation breathing, general relaxation exercises, and distraction), 10 moderately severe COPD patients, (mean age 73 years), demonstrated a 24% improvement in their 6-minute walk distance, but no change in anxiety when compared to eight control patients (Eiser *et al.* 1997). Finally, in an uncontrolled trial of combined education and CBT (relaxation breathing, testing automatic negative assumptions, and reframing), eight COPD patients, (mean age 69.5 years) had a decrease in psychosocial and total Sickness Impact Profile scores but no decrease in depression or anxiety after 8 weeks of treatment (Lisansky & Clough, 1996).

These studies suggest that psychosocial interventions such as CBT have inconsistently decreased anxiety and improved functioning. However, sample sizes in these reports generally were small, and the potential impact of even briefer interventions that may also be efficacious and cost-effective for older adults with COPD were not addressed. Among younger medical patients, even single-session interventions have been used effectively for reducing anxiety (Swinson *et al.* 1992). No similar research has addressed the potential utility of similar brief interventions for older adults with chronic medical illness. Thus, we examined the efficacy of a single 2 h session of group CBT, with follow-up telephone calls over 6 weeks, on anxiety, depression, and functioning in a sample of older COPD patients. CBT included relaxation training, cognitive interventions, and a discussion of exposure techniques.

We hypothesized that compared to an educational intervention, a single 2 h session of group CBT, with 6-week follow-up, would reduce anxiety and depression, improve physical and mental functioning, and lead to a better quality of life and greater satisfaction with treatment in older patients with COPD.

METHOD

Patients

Fifty-six patients with COPD aged 60 or older were recruited from an academically affiliated VA Hospital, a non-profit private hospital, and

through a local newspaper during a 6-week time period. The recruiting information offered a coping skills class to improve functioning in patients with COPD (emphysema). Patients were asked to participate in a clinical trial examining the relationship between functional status and anxiety/depression in persons with COPD. Since the focus of this study was on the typical COPD patient, patients were recruited and included regardless of the presence or absence of depressive or anxious symptoms. Participation was voluntary after informed consent was obtained, and patients were compensated with \$50 to defray cost for transportation and time.

Diagnosis of COPD was confirmed by reviewing pulmonary function tests in the medical records. Two patients did not have charts available and their diagnosis of COPD was confirmed with portable spirometry at pre-assessment screening (forced expiratory volume (FEV) < 0.75). Patients with the following concurrent chronic conditions were excluded: uncontrolled malignancy, myocardial infarction within the prior 6 months, coronary artery disease requiring surgical intervention or angioplasty, end-stage renal disease on dialysis, delirium and dementia.

Patients were assigned using a random number table to CBT or COPD education groups.

Measures

COPD severity

Of the several different lung volumes measured, the forced expiratory volume in 1 second (FEV-1), when used in the context of the patient's clinical picture, is the best prognostic indicator and was chosen to assess COPD severity. FEV-1 has been shown in numerous studies to be one of the best parameters to assess airflow obstruction (American Thoracic Society Statement, 1991; Crapo, 1994). We used a portable spirometer to measure FEV-1 (best of three trials) at all assessments.

Health related quality of life and functional impairment: SF-36 and 6 min walking test

The SF-36 is a 36-item questionnaire measures health related quality of life (Ware & Sherbourne, 1992; Ware, 1993). It assesses eight major health concepts: physical functioning, role limitations due to physical problems, bodily pain, general health, vitality, energy/vitality,

social functioning, role limitations due to emotional problems and mental health. Studies in the general population and samples of COPD patients have demonstrated that the SF-36 is a valid and reliable measure of functional status (Ware *et al.* 1996; Ware & Gandek, 1998; Stavem *et al.* 1999).

The 6 min walking test is an objective measurement of physical functioning and has been shown to have high reliability and validity to measure functional status in patients older than 45 years (Redelmeier *et al.* 1997; Montgomery & Gardner, 1998). Patients were told to walk at a brisk pace for 6 min and the distance walked in that time was measured.

Depression: Geriatric Depression Scale (GDS)

The GDS consists of 30 Yes/No questions, and was specifically developed for older patients. Questions cover mood symptoms, cognitive complaints, and social behaviour. The GDS has been shown to be psychometrically sound (Stiles & McGarrahan, 1998) and valid in detecting depression in elderly psychiatric patients, medically ill patients, and normal controls (National Center for Cost Containment, 1996).

Anxiety: Beck Anxiety Inventory (BAI)

The BAI consists of 21 common anxiety symptoms that are rated by the subject on a 4-point scale (Beck & Steer, 1993). It was specifically designed to identify anxiety symptoms with minimal overlap of depressive symptoms, and questions cover both somatic and cognitive aspects of anxiety. Studies examining the psychometric properties of the BAI have reported high reliability and adequate sensitivity among both younger and older adults (Kabacoff *et al.* 1997; Osman *et al.* 1997).

Satisfaction with intervention

Patient satisfaction was assessed with the Client Satisfaction Questionnaire (Larsen *et al.* 1979), an 8-item, empirically-derived measure that has been widely used to assess patient satisfaction with services (Attkisson & Zwick, 1982; Akkerman *et al.* 1998). Internal consistency for the scale in the current sample was good, $\alpha = 84$. Analyses examined differences in total change score across groups, and whether each group's

scores differed significantly from the score of 16.0, which indicated 'indifference'.

Description of procedures and interventions

Both CBT and COPD education were administered to small groups of patients ($N = 6-10$) during a single session lasting approximately 2 hours. Pretreatment assessment occurred during the first 30 min of this session. Subjects were asked to complete several self-report scales, including the SF-36, the GDS, and BAI. Patients who needed help with these tasks due to physical disability (e.g. tremor, poor eyesight) or lack of education answered the questions posed to them orally by the investigator in a private room. Each patient also completed a 6 min walking test and had an FEV-1 (forced expiratory volume in the first second) tested with a portable spirometer.

Following pre-treatment assessment, CBT was administered by a board-certified geropsychiatrist (M. E. K.). CBT was based on interventions with demonstrated success for reducing symptoms of anxiety, with specific components addressing education, relaxation, cognitive interventions, and graduated practice (Barlow, 1988). During the first hour, patients learned about the role of anxiety and depression in chronic medical illness. The three components of anxiety (i.e. physiological sensation, thoughts and behaviours) also were identified with patients asked to provide examples from their own personal experience. During the second hour of the treatment session, patients were instructed in the use of three types of coping skills to aid in the control of anxiety or stress symptoms. First, relaxation strategies including diaphragmatic breathing and postural changes were modelled and practiced to assist in the reduction of physiological sensations. Secondly, thought stopping and self-instructional training were demonstrated and practiced in an effort to reduce maladaptive thoughts associated with anxiety. Finally, an explanation of exposure to anxiety-producing situations to practice new coping skills was provided to assist in the modification of behaviours that maintain anxiety. At the end of the session, patients were given 'workbooks' and audiotapes reviewing the coping skills and providing practice exercises. Patients were asked to use the learned techniques daily and to review the audiotape as needed.

During the subsequent 6 weeks, patients were called weekly to provide an opportunity to ask questions, monitor compliance and increase the probability of continued practice. At the end of 6 weeks, post-treatment assessments were completed. These included re-administration of pre-treatment assessments and an initial administration of the Client Satisfaction Questionnaire.

The Education Group completed the same pre-treatment assessment instruments as described above (SF-36, GDS, BAI, 6 min walking distance, FEV-1 and VC). Participants then attended one group session with a Board-certified internist (U. B.) who discussed COPD process, aetiology and treatment options. The education intervention did not address strategies to reduce anxiety and depression. The patients were given time to ask questions and share their own experience of living with COPD. They were then called weekly for 6 weeks and given an opportunity to ask questions about COPD. At the end 6 weeks, post-treatment assessments were conducted, with procedures identical to the CBT group. Education participants then received CBT to reduce attrition and provide appropriate clinical care.

Data analysis

Data analyses followed three steps. Initially, descriptive statistics were calculated for subject demographics (gender, age, ethnicity, education, number of patients taking oxygen) and pre-treatment COPD severity (FEV-1, VC), anxiety (BAI), depression (GDS), and functioning (SF-36, 6 min walking test). Group differences in these variables were examined using *t* tests (age, education), chi-square analyses (gender, ethnicity, number of patients on oxygen) and MANOVA (anxiety and depression, COPD severity and functioning).

In the second step, the effects of CBT relative to the education intervention were examined using Group (CBT *v.* Education) by Time (pre-treatment *v.* post-treatment) repeated measures MANOVAs on the following clusters of variables: COPD severity (percentage & VC and FEV-1), psychological measures (BAI and GDS) and physical functioning (SF-36 subscales and 6 min walking test). Significant MANOVA effects were followed by univariate, repeated measures ANOVAs tested at the $\alpha = 0.05$ level.

The final step included an assessment of

patient reports of satisfaction with the interventions. A *t* test compared client satisfaction questionnaire (CSQ) scores at post-treatment in the CBT and education groups. To assess whether patients' satisfaction after education and after CBT differed from the value that indicated indifference (Knight & Satre, 1999), one-sample *t* tests were conducted.

RESULTS

Sixty-one patients were recruited for the study. Five patients refused consent. Of the 56 consenting patients, three patients were excluded from the study due to dementia (2) or no established diagnosis of COPD (1). Fifty-three patients were randomly assigned, 24 to the CBT group, 29 to the education group. Five patients did not participate after the initial session and therefore did not complete all necessary visits. The remaining 21 patients in the CBT group and 27 in the education group comprised the final sample whose data were complete for analyses.

Table 1. Pre-test and post-test means and standard deviations for the cognitive behavioural therapy (CBT) ($N = 21$) and education groups ($N = 27$)

Variable	Group	Pre-test mean (s.d.)	Post-test mean (s.d.)
BAI*	Education	10.0 (6.8)	11.9 (7.6)
	CBT	15.3 (9.2)	12.6 (8.7)
GDS**	Education	7.7 (5.4)	8.8 (7.6)
	CBT	11.5 (7.3)	9.4 (6.5)
SF-36			
Bodily pain	Education	35.1 (21.2)	30.7 (28.4)
	CBT	38.9 (25.1)	30.6 (27.4)
General health	Education	44.7 (20.6)	39.1 (20.7)
	CBT	44.3 (24.9)	44.2 (26.2)
Mental health**	Education	72.3 (17.2)	69.9 (20.8)
	CBT	66.5 (17.5)	73.1 (16.4)
Physical functioning	Education	37.6 (26.5)	35.6 (25.5)
	CBT	34.3 (27.9)	34.8 (29.2)
Role emotional	Education	61.3 (40.5)	66.7 (43.0)
	CBT	65.0 (39.7)	53.3 (47.6)
Role physical	Education	28.0 (38.4)	31.0 (36.3)
	CBT	25.0 (35.4)	28.8 (30.6)
Social functioning	Education	66.0 (22.7)	70.0 (26.3)
	CBT	58.1 (27.9)	54.4 (30.2)
Vitality	Education	50.2 (22.9)	47.6 (27.0)
	CBT	37.0 (20.5)	41.5 (22.4)
6-min walk	Education	998 (369)	1058 (362)
	CBT	1012 (412)	1080 (348)

BAI, Beck Anxiety Inventory; GDS, Geriatric Depression Scale; SF-36, Medical Outcomes Study 36-item short form.

* $P < 0.05$; ** $P < 0.01$.

No differences between the two intervention groups were found in any demographic variables including age (71.3 ± 5.9) and education (13.1 ± 5.9). The sample was 83% men and 90% Caucasian. Patients had mild levels of anxiety (BAI; 12.4 ± 8.3) and depression (GDS; 9.4 ± 6.5). There was also no difference between the groups in COPD severity as measured by FEV-1 (0.43 ± 0.27) or the proportion on oxygen (0.31 ± 0.47).

Pre- and post-means for outcome variables for the CBT and education groups are given in Table 1. Comparison of CBT intervention and education interventions indicated that CBT was superior to education for lowering patients' depression and anxiety as shown by the time by group effect in the MANOVA $F(1, 45) = 9.2$, $P = 0.004$ and the *post hoc* univariate ANOVAs, $F(1, 45) = 7.4$, $P = 0.01$ for GDS and $F(1, 45) = 5.5$, $P = 0.02$ for BAI, respectively. Specifically, the CBT group reported a significantly larger decrease in depressive symptoms than the education group as shown in Table 1 ($P = 0.01$). Similarly, the CBT group reported a significantly larger decrease in anxiety compared to the education group ($P = 0.02$). The education group did not demonstrate significant within group changes in either depression or anxiety ($P > 0.05$). Comparison of CBT and education interventions indicated that CBT did not reduce COPD severity or improve physical functioning ($P > 0.05$). Comparison of CBT and education interventions indicated that both CBT ($t(19) = 12.9$, $P = 0.00$) and education ($t(24) = 12.5$, $P = 0.00$) groups' satisfaction was greater than indifference. There was no difference in the satisfaction of CBT and education groups ($P > 0.05$), indicating that both groups were similarly satisfied.

DISCUSSION

In this randomized controlled trial, we found that one CBT session followed by practice given to older adults with COPD led to decreased depression and anxiety when compared with a group that received education about COPD. Despite the decrease in depression and anxiety, there was no change in the physical functioning of the patients as hypothesized. Patients were satisfied with treatment in both the CBT and educational interventions.

Our results are consistent with the improved psychological findings found in several studies of more intensive relaxation training, but we were not able to detect concomitant physical functioning changes that others have demonstrated (Gift *et al.* 1992; Sachs *et al.* 1993; Eiser *et al.* 1997). Our inability to detect physical changes may have been because our 2 h intervention was not of sufficient intensity or duration. In addition, the study subjects had only mild anxiety and depression, which decreased our ability to effect change in psychological and physical functioning. Alternatively, our measurements of physical functioning may not have been sensitive enough to identify changes. In particular, the SF-36 is a generic measure of health-related quality of life. A questionnaire that examines specific physical functioning of patients with COPD, such as dyspnoea, may have detected physical differences (Jones *et al.* 1991; Martin, 1994; Rutten-van Molken *et al.* 1999).

Practice guidelines for COPD management stress the importance of impacting, not just airflow, but quality of life (VA Medical Advisory Panel, 1996). Patient education, nutritional support, and physical exercise are recommended, but suggestions or mechanisms for improving psychological functioning are not included. Since up to 40% of patients with COPD have significant psychological symptoms, comprehensive care of these patients must address this. With current cost and time constraints, brief effective interventions are paramount. We show that even a 2-hour group intervention is well-received and makes a difference to patients' psychological functioning. CBT may give COPD patients some tools to manage co-morbid anxiety and depression, and education provide emotional support that may add to the satisfaction of participants. Even though patients may not objectively gain in medical status, they may improve in perceived self-efficacy to manage their physical status, thus improving their quality of life.

Our study is limited by its inclusion of primarily men, the lack of long-term follow-up, lack of cost-effectiveness analyses, and its implementation outside the confines of the medical clinics. In addition, our effect was modest. Future studies should be done at primary-care sites, include long-term follow-up and cost

analyses, monitor treatment compliance, and use COPD specific measures of functioning. Effect-sizes might be greater if the intervention is examined in patients selected for anxiety or depression co-morbidity. In addition, the CBT intervention should be assessed using a nurse or other non-physician provider to extend the practicality and lower the cost of such an intervention in the primary-care setting. Psychological outcome measures such as self-efficacy should be included to assess the specific mechanisms implicated in improved psychological functioning, and to identify the particular ingredients necessary for practical cost-effective therapy.

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