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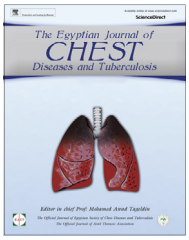

ORIGINAL ARTICLE

Influence of 7 weeks self management education on the BAI and 6MWD of COPD stable patients

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KEYWORDS

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Abstract This study examines the effect of self-education on, exercise tolerance, and dyspnea. Twenty patients with stable COPD (mean forced expiratory volume in one second FEV1 = 1.29 ± 0.28, 6MWD 333.15 ± 70, BAI43.15 ± 3.47) had seven 90 min sessions of self-education at weekly intervals.

Patients completed the Beck Anxiety Inventory (BAI), one day before and seven weeks after therapy. FEV1, forced vital capacity (FVC), blood gas tensions and six minute walking distance (6MWD) are measured.

Twenty control patients attended weekly, they were assessed using spirometer and 6MWD was measured for seven weeks. There were no differences in mean baseline age, (BAI) score, lung function, blood gas tensions or 6MWD between groups.

After treatment, the BAI score had decreased significantly to 40.8 ± 3.11, in association; the mean 6MWD had also improved in the treated group only, from 333.15 ± 70 to 376.9 ± 64.9 meter, an increase of statistically significant p value of 0.042.

In conclusion: Seven week self-management education to COPD patients produced a significant improvement in exercise tolerance and BAI score.

Introduction

Chronic obstructive pulmonary disease (COPD) is a serious public health problem worldwide. The prevalence, morbidity, and mortality are expected to rise, especially in countries with a rapidly aging population and even in populations with reduced smoking rates [1–3]. A study published by the World Bank/World Health Organization reported that COPD is likely to rise from being the twelfth most burdensome disease in 1990 to the fifth in 2020 [4]. This will place an enormous burden on the healthcare system and will cause a loss in health

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related quality of life (HRQoL) for many patients with COPD. Treatment for COPD is often primarily aimed at improving airflow obstruction by bronchodilator and anti-inflammatory therapy, despite indications that airflow obstruction is irreversible and there is an apparent lack of effect of pharmacological interventions on the progressive decline in health status. Despite optimal pharmacological treatment, many patients with COPD experience substantial functional impairment [5,6]. However, airflow obstruction correlates poorly with disease perception by the patient [7,8]. COPD is a systemic inflammatory disease and, besides airflow limitation and hyperinflation due to loss of elastic recoil and intrinsic airway narrowing, systemic deficits such as skeletal and respiratory muscle dysfunction are prominent features. There is a growing need for other forms of treatment for COPD patients, not only to control and alleviate symptoms and complications of respiratory dysfunction but also to teach them how to carry out the activities of daily living optimally in the face of their physiological impairment [9].

As regards asthma, patient education and self-management programs have proved to be successful at least when combined with a regular review in reducing the economic burden of the disease and in improving quality of life and lung function [10–14]. In COPD, pulmonary rehabilitation has been shown to increase exercise tolerance and quality of life [15]. The drawback is that pulmonary rehabilitation programs will normally be more expensive and time consuming for both professionals and patients than self-management programs, and may be less widely available.

Worth and colleagues [16] were the first to describe the effectiveness of a program aimed at acquiring self-management skills and behavioral changes by patients with COPD. Unfortunately this pilot study was uncontrolled and studied only a small sample of patients ($n = 21$). Impressive reductions in the frequency of exacerbations and home visits by the family doctor were observed, but no changes in lung function were found. Several controlled trials have been conducted to evaluate the effectiveness of COPD education and self-management education programs [17]. This review was conducted to examine the impact of these programs on health outcomes and healthcare utilization.

6MWD is a practical field test but its correct interpretation is more debatable [18]. Studies have used the absolute value in meters to determine its prognostic ability or its responsiveness to pulmonary rehabilitation [19] or lung reduction surgery [20]. However, it is well known that the 6MWD is influenced by age, sex and height. Indeed, the two studies validated herein, have provided reference equations based on the testing of normal individuals and then expressed the observed results as a percentage of predicted normal [21,22].

Subjects and methods

20 patients with stable COPD scores of $\geqslant 22$ for anxiety on BAI scoring participated in the study, further 20 patients, matched for severity of dyspnea and disability, were chosen and agreed to act as controls. Exclusion criteria for patient are chest infection within 1 month of the start of the study. Bronchodilators were omitted four hours before initial measurements on each day of the test .Verbal informed consent was accepted from all participants.

All patients enrolled in the study completed Beck Anxiety Inventory (BAI) questionnaires in the chest clinic at New Jeddah Hospital. The BAI (Beck AT and Steer RA, 1990) is a self-administered questionnaire, comprising 21 questions aimed to detect the severity of anxiety.

Control group: Patients attended seven times, at weekly intervals for seven weeks aiming to give them some reason to attend the Chest Clinic for the same number of times as the active treatment group, FEV1, FVC and 6MWD, arterial blood gases and BAI scores were measured during each visit at baseline and week seven.

The results from day one and week seven were compared with those from the active treatment group on baseline and post therapy days (Fig. 1).

Education

The education method allowed COPD patients to attend lectures once a week, for seven weeks each for 60–90 min to meet the pulmonologist, psychiatrist and the internist.

The education contents:

(1) Explain the causes, symptoms, and predisposing factors to COPD patients.
(2) Guide patients to make effective cough, breathing exercises, abdominal breathing method, and enable patients to demonstrate, the method correct.
(3) Guide patients on oxygen therapy methods and precautions.
(4) Guide the patient to a proper diet, and instructed patients that a proper diet is an important role in the treatment of disease.
(5) Stress the method of medication, time, and inform the importance of continued drug use.

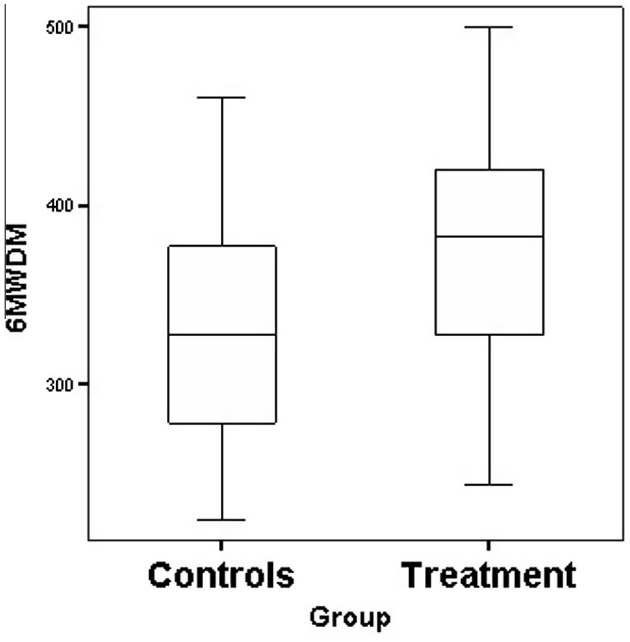

Figure 1 Box Whisker plot of the 6MWT values between treatment and control groups.

(6) Quit smoking, to have a regular life style, pay attention to work and rest balance.
(7) Add cloth when the weather cools to prevent and avoid cold.
(8) Instruct patients to try not to go to crowded public places.
(9) Understand the patient's psychological changes, and help patients to resolve the disease to their psychological pressure in time.
(10) Guide families' supervision of the implementation of self-management education for patients. In addition, they were given homework: breathing and relaxation exercises for 10 min three times daily.

The statistical paragraph in material and methods

Data were statistically described in terms of mean ± standard deviation (±SD), median and range, or frequencies (number of cases) and percentages when appropriate. Comparison of numerical variables between the study groups was done using Student *t* test for independent samples. For comparing categorical data, Chi-square (χ^2) test was performed. Exact test was used instead when the expected frequency is less than 5. *p* values less than 0.05 were considered statistically significant. All statistical calculations were done using computer programs SPSS (Statistical Package for the Social Science; SPSS Inc., Chicago, IL, USA) version 15 for Microsoft Windows (Table 1).

Results

Mean age was (64.45) ±4.92 y in the treatment group and (67.30) ±6.09 y for controls. Mean ± SD baseline forced expiratory volume in the first second (FEV1) was (1.28) ±0.24 for the treatment group and (1.29) ±0.28 for controls.

Comparing treatment group with controls, there were no significant differences in lung function or blood gas tensions, neither at the start of treatment nor at the end of it (Table 2).The scores from BAI were comparable between groups on baseline 40.8 ± 3.1and 43.15 ± 3.74 for the treatment and control group respectively (Table 2).

In the control group, none of the physiological or psychological measures altered significantly during the study. On the other hand, in the active treatment group, psychological test (BAI) scores were significantly different at the end of psychotherapy compared to baseline values ($t =$ & $p \leqslant 0.001$). In concordance the mean 6MWD increased very significantly from 333.15 ± 70 meter at baseline to 376.9 ± 64.9 meter after psychotherapy (t & $p < 0.001$).

The difference in BAI scores at 7 weeks compared with controls was also statistically significant ($p < 0.001$) (Table 3)

There was no significant difference in sex in both groups (Table 2).

Discussion

COPD is a disease that impairs functional capacity. However, the degree of exercise intolerance as measured by the 6MWD test varies widely even among patients with similar airflow limitation. This was evident in large clinical trials such as those of patients enrolled for lung volume reduction surgery [23], who by design had a narrow range of airflow limitation but a wide range of exercise performance. The exact reason for exercise limitation in COPD is not fully understood but appears to be somewhat independent of FEV_1. In the majority of patients with COPD, dyspnea is a main limiting factor [24], likely related to hyperinflation [25,26] airflow limitation [27] and impairment in diffusing capacity [28]. In addition, skeletal muscle dysfunction has also been implicated in the genesis of exercise limitation among patients with COPD [29]. The muscle of COPD patients shows structural and metabolic abnormalities, not seen in normal patients of similar age [19,30,31]. Whatever the exact reasons for exercise limitation, the evaluation of exercise capacity using the 6MWD in patients with COPD helps assess disease severity. Furthermore, identifying levels of exercise impairment helps with the characterization of these patients and assists with the referral to programs such as pulmonary rehabilitation, lung reduction surgery or lung transplantation.

Pulmonary rehabilitation provides an important treatment option for patients with dyspnea due to severe COPD [32,33]. The main components of rehabilitation were education, breathing training exercises, systemic exercises, pharmacological and oxygen treatment, and patient support groups [34,35]. Although, the importance of psychological support as part of rehabilitation has increasingly been emphasized recently [36–38] there is little published information on the

Table 1 Report.

Group		Age	FEV1L	FVCL	PaO2	PaCO2	6MWDM	BAIscore
Treatments	Mean	64.45	1.2895	2.95	76.490	43.355	376.10	40.80
	N	20	20	20	20	20	20	20
	Std. deviation	4.925	0.24916	0.38	1.3742	0.9578	64.953	3.122
	Minimum	58	0.90	0.90	73.9	42.1	244	36
	Maximum	74	1.75	1.75	79.3	45.2	500	47
	Median	63.00	1.2400	1.2400	76.250	43.050	383.00	41.00
Controls	Mean	67.30	1.2995	2.73	74.220	43.130	331.15	43.15
	N	20	20	20	20	20	20	20
	Std. Deviation	6.097	0.28616	0.81	0.8924	0.9056	70.052	3.746
	Minimum	56	0.95	2.20	73.0	41.4	224	36
	Maximum	78	1.80	3.55	76.1	44.6	460	49
	Median	67.50	1.2100	2.6250	73.950	42.950	327.50	44.00
p value		0.112	0.9068	0.0000	0.000	0.450	0.042	0.038

Table 2 Male and female percentage in two groups.

			Group	
			Controls	Treatment
Sex	F	Count	7	8
		% within Group	35.0%	40.0%
	M	Count	13	12
		% within Group	65.0%	60.0%
p value			0.744	

relative importance of psychotherapy on the treatment of severe COPD patients.

The two studied groups in this study were well matched in terms of lung function, walking distance, and BAI scores. Ninety percent of the treatment group had severe anxiety scores of $\geqslant 35$, while 80% of the control patients had anxiety scores above 35. As we match patients for BAI scores in order to make the comparison more complete, the control patients were being selected mainly for comparable disability in terms of breathlessness and anxiety.

The BAI scores improved after therapy, and all patients who completed the course of treatment claimed to feel more relaxed and generally better. In contrast to our finding, in the study of [39] surprisingly, he found that the anxiety scores did not improve after therapy, but in his study the HADS anxiety scale was used to assess the degree of anxiety and it is possible that the HADS score is not sensitive enough to have detected any changes achieved. In addition, the sessions in the study by Eiser et al. [40], and Funk et al. [41] concentrated particularly on education, muscle relaxation and breathing exercises, whereas in the present study the psychiatrist concentrated more on exploring the roots of the patients' anxieties and developing general psychological coping strategies. The breathing exercises were directed predominantly at general relaxation rather than training of muscle groups. Generally, we are in agreement with Atkins et al. [42], and Puhan et al. [43] who mentioned that a much longer rehabilitation program, including psychological sessions, was more effective in reducing anxiety than rehabilitation sessions alone [44].

The significant effect of the psychotherapy and education on reducing anxiety level in the present study was reflected on the increase in exercise tolerance, which was evident after treatment. The 6MWD test proved a reliable and reproducible method for assessing exercise tolerance [45]; Eieser et al. [46] proved the improvement in six MWD, was sufficient to produce a significant difference from the baseline measurement and when compared with controls (Table 3). This significant effect of the psychotherapy and education on increasing the exercise tolerance in patients with COPD was found in another study [39] which was partly sustained at 3 months after treatment. Nevertheless, according to the study of Eiser et al. the improvement in exercise tolerance, though highly statistically significant, was not related to the HADS scores. Again, the positive outcome in our study is best attributed to the differences in style and content of the sessions, which produced interesting results in terms of improvement in cognitive style and coping mechanisms rather than just improving the exercise capacity. In agreement with our explanation, Sassi et al. [47] found a significant improvement in the transitional dyspnea index in patients with COPD who received proper cognitive psychotherapy. He found that in 6 months after treatment with psychotherapy patients, with dyspnea for any cause, who were taught coping strategies by a psychotherapist, would respond better to treatment than patients who had general education sessions alone [42].

Regarding the improvement in pulmonary function, in the present study, there was no change either in lung function or in arterial blood gas tensions. We may need a further larger study with a longer and/or more intensive course of psychotherapy and education programs in order to establish whether any improvement in pulmonary function or ABG could be achieved.

In conclusion

A seven-week course of self-management education, cognitive and behavioral psychotherapy from psychiatrists produced a significant improvement in exercise tolerance in anxious, breathless patients with chronic obstructive pulmonary disease, because of significantly alleviating their anxiety and improving their self-management styles. Much larger numbers of patients would be required to establish whether this approach to treatment would be worthwhile routinely in the clinical setting.

Conflict of interest

None declared.

Table 3 Effects on lung function, arterial blood gas tensions, 6 min walking distance (6MWD) and anxiety scores between two groups.

	Treatment group			Control group		
	Baseline	7-Week post-Rx	*p*	Baseline	7-Weeks	*p*
FEV1 L	1.29 ± 0.28	1.29 ± 0.25	0.90	1.34 ± 0.39	1.25 ± 0.37	0.66
FVC L	2.77 ± 0.39	2.95 ± 0.38	0.33	2.73 ± 0.81	2.76 ± 0.23	0.91
6MWD m	333.15 ± 70	376.9 ± 64.9**	0.042	358.2 ± 31.3	367.8 ± 76.	0.09
*P*aCO2	43.13 ± .90	43.35 ± .95	0.45	43.42 ± 1.22	43.90 ± 1.3	0.90
*P*aO2	74.22 ± .89	76.94 ± 1.37	0.75	76.70 ± 2.23	75.89 ± 2.1	0.16
BAI score	43.15 ± 3.74	40.8 ± 3.11**	0.038	40.8 ± 4.2	40.1 ± 7.8	0.94

Values are presented as mean ± SD. Post-Rx: post-therapy.
** $p < 0.05$, compared to control group after 7 weeks (unpaired *t*-test).

Beck Anxiety Inventory

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

	Not At All	Mildly but it didn't bother me much.	Moderately - it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding/racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot/cold sweats	0	1	2	3
Column Sum				

Scoring - Sum each column. Then sum the column totals to achieve a grand score. Write that score here _____ .

Interpretation

A grand sum between **0 – 21** indicates very low anxiety. That is usually a good thing. However, it is possible that you might be unrealistic in either your assessment which would be denial or that you have learned to "mask" the symptoms commonly associated with anxiety. Too little "anxiety" could indicate that you are detached from yourself, others, or your environment.

A grand sum between *22 – 35* indicates moderate anxiety. Your body is trying to tell you something. Look for patterns as to when and why you experience the symptoms described above. For example, if it occurs prior to public speaking and your job requires a lot of presentations you may want to find ways to calm yourself before speaking or let others do some of the presentations. You may have some conflict issues that need to be resolved. Clearly, it is not "panic" time but you want to find ways to manage the stress you feel.

A grand sum that **exceeds 36** is a potential cause for concern. Again, look for patterns or times when you tend to feel the symptoms you have circled. Persistent and high anxiety is not a sign of personal weakness or failure. It is, however, something that needs to be proactively treated or there could be significant impacts to you mentally and physically. You may want to consult a physician or counselor if the feelings persist.

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