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An Experimental Study to Assess the Efficacy of Selected Interventions on Dyspnea and Quality of Life in COPD Patients.

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Introduction

COPD is a major and growing cause of disability and death around the world. Exacerbations of COPD are associated with intermittent hospitalizations due to acute deterioration in the symptoms of chronic dyspnea, cough, and sputum production. Hospitalizations for COPD exacerbations are common (up to 60%) and an important part of COPD care. Anxiety and depression are the most common psychological comorbidities in COPD patients, and they have a negative impact on quality of life. Physical roles, emotional roles, social functioning, bodily pain, mental health function, and vitality are associated with greater disability and impaired functional status in general health5.Even after controlling for the effects of overall health status, such as additional medical diseases, COPD severity, and dyspnea, anxiety and depression are still significantly associated with lower functional status. Anxiety is also linked to COPD symptoms like FVC, chest pain, and shortness of breath.Physiological arousal increases breathing frequency, and in COPD patients, anxiety-induced hyperventilation exacerbates shortness of breath by causing bronchoconstriction and lung hyperinflation. Hyperinflation increases the work and effort required for breathing while decreasing inspiratory reserve capacity.

Finally, anxiety is a significant predictor of COPD exacerbation hospitalisation, mortality risk, relapse risk, and hospital readmission. Few studies have been conducted to evaluate anti-anxiety programmes in COPD exacerbation patients. Numerous studies have been conducted to investigate the anxiety that develops during the hospitalisation process. However, few studies have looked into the effects of a breathing programme on anxiety. Previous research has found that controlled breathing is an effective treatment for a variety of pulmonary symptoms. The researchers hypothesised that controlled deep breathing would reduce negative emotion levels, as it has been shown to do in the case of smoking withdrawal. Active expiration, slow and deep breathing, pursed-lips breathing, relaxation therapy, specific body positions, inspiratory muscle training, and diaphragmatic breathing are all examples of controlled breathing exercises. Controlled breathing alleviates dyspnea in COPD patients by reducing dynamic hyperinflation, improving gas exchange, increasing respiratory muscle strength and endurance, and optimising the thoraco-abdominal motion pattern. Furthermore, psychological effects such as controlling respiration may contribute to the efficacy of controlled breathing. These effects, however, are not addressed in the current study. At Sree Ragavendra Hospital Dharmapuri, researchers looked at how easy it would be to use controlled breathing techniques with COPD patients who were in the hospital because their symptoms were getting worse. They also looked at how well these techniques helped improve dyspnea, sleep disturbances, anxiety, depression, and quality of life.

Methods

The ethics committees of Sree Ragavendra Hospital , Dharmapuri approved this randomised pilot study, and all subjects provided written consent. The effects of a 10-day controlled breathing programme were compared to the effects of a standard care control intervention in subjects hospitalised for COPD exacerbation at Sree Ragavendra Hospital Dharmapuri. Subjects in the standard care group were given standard medical care. At hospital admission and discharge, primary and secondary outcomes were assessed. Calculating the Sample Size The primary outcomes, anxiety and depression symptom scores, were used to calculate the sample size. As in previous studies, an increase in anxiety and depression symptoms (2 3.3 points on the Hospital Anxiety and Depression questionnaire score) was expected in the control group, with a small positive effect (5 points on the Hospital Anxiety and Depression questionnaire score) expected in the treatment group. Using a 2-sided =.05 and a 20% dropout rate, we needed 23 subjects in each group to show statistically significant differences in anxiety and depression between the two groups. The Procedure for Randomization A computer-generated randomization list was used by an independent nurse to assign subjects to the treatment or control groups. After the person agreed to be in the study and was accepted, the nurse told the physiotherapist. Subjects Forty-six patients admitted to the hospital's pulmonary care unit and diagnosed with a non-infectious exacerbation of COPD were recruited over a 6-month period. The American Thoracic Society criteria were used to make the diagnosis of COPD. All subjects had been exacerbation-free for at least 10 days (range 10–12 d). Patients with other organ failure, cancer, or an inability to cooperate were barred from participating. During the exacerbation, all of the subjects got standard medical care, such as systemic steroids (76%), inhaled bronchodilators (100%), and oxygen.

Programme for controlled breathing. During the hospitalisation, a researcher delivered the controlled breathing programme twice a day. The physiotherapy session lasted 30 minutes, and the subjects were instructed to take 3 minute breaks as needed. The controlled breathing programme included the following exercises: relaxation, pursed-lips breathing, and active expiration. Relaxation Exercises The research on relaxation exercises is based on the observation that hyperinflation is a partially reversible airway obstruction caused, at least in part, by increased inspiratory muscle activity during expiration. This increased activity may persist even after recovering from an acute episode of airway obstruction, contributing to dynamic hyperinflation. Relaxing is also meant to make you breathe less often while increasing your tidal volume. This makes your breathing more efficient. Breathing with Pursed Lips Pursed lip breathing improves expiration by necessitating active and prolonged expiration as well as preventing airway collapse. Through pursed lips, the subject performs a moderately active expiration, inducing an expiratory pressure of about 5 cm H2O. Pursed lip breathing, when compared to spontaneous breathing, reduces breathing frequency, dyspnea, and PaCO2, while increasing tidal volume and oxygen saturation at rest. Patients who get relief from their symptoms have a bigger increase in tidal volume and breathe less often.Expiration that is active Contraction of abdominal muscles during active expiration increases abdominal pressure, which lengthens the diaphragm and contributes to the diaphragm operating at its optimal length. Indeed, there was no difference in diaphragm displacement and its contribution to tidal volume during resting breathing between COPD patients and healthy subjects. Also, active expiration raises the elastic recoil pressure of the diaphragm and rib cage, which helps the next breath in when it is released after the muscles of expiration have relaxed.In conclusion, active expiration is a normal response to increased ventilatory needs. Depending on the severity of the airway obstruction, spontaneous abdominal muscle activity is often present at rest in COPD patients. Although active expiration improves diaphragm function, its impact on dyspnea is unknown. Measures of Success Anxiety and Depression Scale in the Hospital The Hospital Anxiety and Depression Scale is a 14-item self-reported questionnaire used to screen for psychological morbidity in medically ill patients. It includes subscales for depression and anxiety, with scores ranging from 0 to 21. A score of 8 or higher on either subscale indicates possible depression and anxiety, while a score of 11 or higher indicates probable depression and anxiety. A depression scale score of 8 is considered normal; 8–10 indicates mild depression; 11–14 indicates moderate depression; and 15 indicates severe depression. With Cronbach alpha values of 0.83 for anxiety and 0.82 for depression, the Hospital Anxiety and Depression Scale is a valid measure of depression and anxiety. A Questionnaire for St. George's Respiratory System The St George's Respiratory Questionnaire is a standardised, self-administered questionnaire used to assess patients with airway disease's impaired health and perceived health-related quality of life. It contains 50 items divided into three categories: symptoms, activities, and impacts. Each domain receives a score, and the total score includes all domains. A low score indicates a higher level of health-related quality of life. The Dyspnoea Scale was modified by the Medical Research Council. The modified Medical Research Council chronic dyspnoea self-administered questionnaire, which has 6 questions about how short of breath a person feels, was used to measure dyspnoea. No dyspnoea is represented by category 0; slight dyspnoea is represented by category 1 (bothered by shortness of breath when hurrying on the level or walking up a slight hill); moderate dyspnoea is represented by category 2 (walks slower than people of the same age on the level due to breathlessness); moderately severe dyspnoea is represented by category 3 (must stop due to breathlessness when walking at own pace on the level); severe dysA Questionnaire on Quality of Life The EQ-5D visual analogue scale and the EQ-5D index comprise the generic Quality of Life questionnaire. The visual analogue scale has a rating scale of 0–100% (0% = death/worst possible health, and 100% = best possible health). Mobility, self-care, usual activity, pain/discomfort, and anxiety/depression are the five domains of the questionnaire. The subject chooses one of three descriptive health states (from good to poor) for each item, and the number or percentage of subjects who choose each state is recorded. Hand-Grip Power Hand-grip strength was measured using a dynamometer (TEC-60, Technical Products, Clifton, New Jersey) that was individually adjusted for the size of the subject's hand-grip. On each hand, three measurements were taken, and the peak force was recorded. This test has been used to assess muscle strength in COPD patients. Respiratory Muscle Power. The researchers measured each subject's maximum inspiratory and expiratory rates four times at 2-minute intervals and normalised the readings to predicted values. Cardiopulmonary physiotherapists performed all respiratory tests on the subject while he was sitting. Statistical Analysis The Mann-Whitney U test for continuous variables and the chi-square test for categorical variables were used to compare baseline characteristics.

Results

The results are displayed as a number and a percentage, or as a mean SD. The 2-way repeated-measures analysis of variance was used to examine inter- and intra-group differences. For intra-group comparisons, we also used the paired-sample Student t test. An intention-to-treat analysis was performed, assuming that subjects who were unable to complete the programme improved at the same rate as the average improvement in the intervention group. A two-tailed P value of.05 was deemed significant. All statistical analyses were carried out using statistics software (SPSS 20.0, SPSS, Chicago, Illinois). Results The findings revealed that all of the subjects were men. The intervention group had a mean age of 76.55 years and the control group had a mean age of 74.436.7 years. The percentages of subjects who used alcohol and tobacco did not differ significantly. Both the intervention and control groups were hospitalised twice a year. The subscales of the St. George's Respiratory Questionnaire showed that the activity domain and total score were significantly different between the groups, with higher scores in the control group showing a lower quality of life.There were no significant differences in any of the baseline values. The intervention group's dyspnea scores improved significantly (P =.004), whereas the control group's dyspnea scores increased between baseline and discharge. The controlled breathing intervention improved the anxiety and depression subscores of the Hospital Anxiety and Depression scale. The depression score had a higher mean change value (10.56 versus 0.465). At the end of the study, all of the European Quality of Life subscales were better in the intervention group, with the mobility and anxiety/depression scores getting better the most.Discussion The goal of this study was to see how a controlled breathing programme affected anxiety and depression in patients hospitalised for COPD exacerbation. Even though many studies have looked at the physical and mental effects of hospitalization, none of these effects have been looked at in acute COPD. Previous research has discovered that COPD patients have a poor physiological status, a moderately impaired quality of life, and higher levels of anxiety and depression than other pathologies. Individuals with COPD also reported that episodes of heightened and intractable dyspnea were inextricably linked to anxiety. Anxiety and/or depression are big reasons why COPD patients with poor health-related quality of life might have to go back to the hospital within a year. Several studies have evaluated therapies for anxiety, depression, quality of life, and function in subjects hospitalised for COPD exacerbation, with contradictory results. In one trial, compared to standard care, incentive spirometry significantly improved St George's Respiratory Questionnaire scores,

while another trial found a mean increase in the Barthel score, favouring the use of a gutter frame over a rollator. When the incentive spirometry group was compared to the standard care group, no significant improvements in daily weight, eating, sleeping, or exercise scores were found. To the best of our knowledge, no previous studies have evaluated the efficacy of a therapeutic programme in subjects with COPD exacerbation, taking into account the variables included in the current study. Several studies have shown that COPD exacerbations hurt the health-related quality of life, pulmonary function, and survival of people with COPD.Due to the hospitalisation effect, the current study found a significant improvement in functional and psychological variables in the intervention group and a significant deterioration in the control group. This suggests that the patient's inactivity while hospitalised contributes to functional and psychological impairment during a COPD exacerbation. Anxiety in COPD patients can be reduced by pulmonary rehabilitation programmes. Emery et al. discovered that an exercise training programme combined with stress management education significantly reduced anxiety. Surprisingly, stress management sessions without exercise training had no effect on anxiety. This fits with our findings, which show that exercise in its different forms (breathing or global training) can help COPD patients feel better emotionally. The current study had two significant limitations. First, the sample size was small, with only males included. Second, no follow-up data was obtained after discharge.

Conclusions

Our study addresses an important rehabilitation option in COPD patients, and it is unique in that few studies have looked at the effect of breathing techniques during the early post-exacerbation period.

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