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EVALUATION OF THE APPLICATION EFFECT OF ONLINE MINDFULNESS-BASED COGNITIVE THERAPY IN THE HEALTH MANAGEMENT OF ELDERLY PATIENTS WITH COPD DURING THE NOVEL CORONAVIRUS PNEUMONIA EPIDEMIC

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Abstract

The aim of this paper is to evaluate the effectiveness of the application of online mindfulness-based cognitive therapy to elderly patients with chronic obstructive pulmonary disease during the lockdown period due to the COVID-19 epidemic. From January 23, 2020 to March 30, 2020, one hundred and thirteen elderly patients with stable COPD were selected as participants of the research, and a WeChat group was used for mindfulness-based cognitive therapy. CAT and mMRC were used to compare the symptoms and health status of patients before and after the epidemic lockdown. After the epidemic lockdown, the cough symptoms, energy status, total score and mMRC score in the CAT questionnaire were lower than before the epidemic lockdown, and the difference was statistically significant (p<0.05). During the epidemic lockdown, the use of WeChat groups to conduct mindfulness-based cognitive therapy for elderly patients with chronic obstructive pulmonary disease can help alleviate panic, improve patients' self-management behavior, and enhance the quality of life and health of patients.

Keywords: mindfulness-based cognitive therapy; elderly; chronic obstructive pulmonary disease; COVID-19; epidemic lockdown

Introduction

In early 2020, there was an outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-COV-2) infection, and people making the population in

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general susceptible, with higher morbidity and mortality rates in the elderly and those with previous chronic diseases such as COPD (Chronic Obstructive Pulmonary Disease Group of Chinese Thoracic Society; Chronic Obstructive Pulmonary Disease Committee of Chinese Association of Chest Physician, 2020). The incidence rate of COVID-19 in Jingzhou City, Hubei Province, was the fifth highest in China in January 2020 (Jiang et al., 2020). In order to prevent the widespread of the epidemic, the Jingzhou government declared an epidemic lockdown on January 23, 2020, and a home quarantine of 6 million people in the city until it was lifted on March 31, 2020, a move of great significance to safeguard people's lives. However, during the lockdown period, people's habits were forced to change, they lived a boring life in a limited space, and were overwhelmed by a large amount of information on the mass media that seemed difficult to distinguish from the truth. People were in a state of panic and even experienced emotional responses such as suspicion, nervousness, stress, anxiety, insecurity, and depression, as well as cognitive changes and physical symptoms of discomfort (Chang et al., 2021). The prevalence of anxiety and depression in COPD patients is much higher than that of other populations (Liu et al., 2020). The elderly population has a high incidence of depression and are susceptible to the recurrence of depression due to the impact of stressful events (Zhou et al., 2019). Due to the unknown development of the epidemic and concerns about their own diseases, the emotional burden of elderly COPD patients has significantly increased (Zhao., 2020).

Mindfulness-based cognitive therapy (MBCT) can disengage from negative thinking such as depression and anxiety, prevent the recurrence of cyclical anxiety and depression, and improve the level of mindfulness cognition in thinking (Teasdale et al., 2000). This study explores an approach of using online mindfulness-based cognitive therapy to improve the well-being of elderly COPD patients who are managed at home during the lockdown period of the COVID-19 epidemic. Studies have shown that the CAT score of COPD patients is closely related to anxiety and depression (Hilman, Sally, & Yuben, 2018). MBCT , as an effective complement to pulmonary rehabilitation programs,can provide significant and lasting stress relief in patients with COPD(Farver-Vestergaard et al., 2018). Our hypothesis is that MBCT will be effective in relieving the stress and reducing the CAT score of COPD patients.

Methods

Participants

Convenient sampling of 206 elderly COPD patients with stable disease was used to select the study population, and the questionnaire stars, which is a professional online questionnaire survey evaluation and voting platform was used to investigate the subjects from January 23-26, 2020 and March 31-April 3, 2020,

respectively. A total of 113 cases were included for data analysis after excluding 63 patients who did not complete the scoring within the above time, 27 defaulters, and 3 deaths (not caused by respiratory diseases). Inclusion criteria: (1) Complying with the diagnostic criteria of COPD in the "Global Strategy for the Diagnosis, Treatment and Prevention of Chronic Obstructive Pulmonary Disease (2019)" GOLD guidelines: After bronchodilators are used in lung function tests, FEV1/FVC<0.70, it is determined that there is persistence Airflow obstruction, combined with risk factors such as corresponding symptoms and exposure to harmful substances; in the stable phase (standard for stable phase: patients with stable or mild symptoms such as cough, sputum, and shortness of breath; (2) to voluntarily participate in this study. Exclusion criteria: (1) Being infected with the COVID-19; (2) admission to hospital for non-respiratory diseases; (3) Cannot use mobile phones to complete the electronic questionnaire.

Procedures

First, an expert group for mindfulness-based cognitive therapy was established. This was a multidisciplinary team consisting of 2 psychotherapists, 1 respiratory specialist, 1 respiratory specialist nurse, 1 rehabilitation specialist, 1 dietitian, and 1 clinical pharmacist. The expert team was composed of 7 professional and technical personnel. A dedicated person was given the responsibility for team scheduling and work coordination.

Through the WeChat group, psychotherapists carry out online mindfulness cognitive training once a day for 45 to 60 minutes. The MCBT curriculum was designed based on articles review (Gu, Strauss, Bond, & Cavanagh., 2015; Querstret, Morison, Dickinson, Cropley, & John, 2020; Farver-Vestergaard et al., 2018), as detailed in Table 1.

Table 1. MBCT implementation plan

Time	Content
Preparation Stage	Topic: Theory explanation
Feb. 1-Feb. 2	Self-introduction of psychotherapist
	Introduction to Mindfulness-based cognitive therapy
	Explanation of the content and requirements of cognitive recording
Week 1	Topic: Beyond Auto-Navigation
Feb. 3-Feb. 8	Body Scan
	Raisin exercise
Week 2	Topic: Another Way of Knowing
Feb. 10-Feb. 15	Two ways of knowing
	10 minutes of meditation with positive thoughts
Week 3	Topic: Bringing Together the Scattered Mind Positive stretching and positive
Feb. 17 - Feb.22	breathing;
	3 min breathing space - regular pose
	Positive Movement
Week 4	Topic: Identifying Avoidance Reactions
Feb. 24-Feb. 29	Meditation
	Mindful walking
Week 5	Theme: Allowing everything to be as it is
March 2 - March 7	Exploring Difficult Positive Mindfulness Practices
	3min Breathing Space - Response Pose

Time	Content
Week 6	Topic: Thoughts are just thoughts
March 9 - March 14	Audio: 20 min Positive Meditation
Week 7	Theme: Turning Kindness into Action
March 16 - March 21	Silence
Week 8	Topic: What to do now
March 23 - March 28	Group members describe their growth and gains from participating in this Mindfulness-based cognitive therapy exercise, and the psychotherapist summarizes.

Regularly, knowledge of new crown pneumonia epidemic prevention and COPD are sent into the WeChat group. Reference was made from the Chinese Medical Association Respiratory Diseases Diagnosis and Treatment Guidelines (2013 revision), the 2019 COPD Global Initiative diagnosis and treatment and prevention strategies to formulate health education content, including basic knowledge of COPD disease, inhaled drug use, Pulmonary rehabilitation knowledge, nutrition management. According to the "Guidelines for the Diagnosis and Treatment of Novel Coronavirus Pneumonia (Later named COVID-19 by WHO)" issued by the National Health Commission (Trial First Edition)-(Trial Seventh Edition), to formulate COVID-19 epidemic prevention knowledge, hand hygiene, household disinfection and protection, COPD patient mask selection and wearing, etc. content.

Through the WeChat group, experts from a multidisciplinary team promptly answered questions about COPD and COVID-19 prevention raised by patients and their families online and provided medication reminder function and rehabilitation training videos to guide patients to self-manage at home every day. Pushed questionnaire link to evaluate the patient's condition at the beginning and the end of the epidemic lockdown.

Measures

The quality of life of COPD patients were measured using the COPD assessment test **(**CAT; Jones et al., 2009**).** Severity of COPD symptoms were measured using the Breathlessness measurement using the modified British Medical Research Council (mMRC):

COPD assessment test. The CAT questionnaire is a self-assessed test questionnaire. It includes 8 items including symptoms, activity ability, psychology, sleep, and social influence. Each item has a score from 0 to 5, with a total score of 0 to 40. The higher the score, the more serious the disease. The total Cronbach's α coefficient of the Chinese version of the CAT questionnaire is 0.805 (Chai et al., 2011).

Modified British Medical Research Council. The National Guidelines for the Diagnosis and Treatment of Chronic Obstructive Pulmonary Disease (2013 revision) recommended mMRC, a five-level rating (0-4) scale based on the patient's perception of the severity dyspnea in daily activities (Mahler & Wells, 1988), as a

symptom assessment tool (Chronic obstructive pulmonary Disease Group, Chinese Society of Respiratory Medicine. 2013).

Data collection and Analysis

During the hospital visit by COPD patients, a health record is established. Including general information: the investigator designed a questionnaire for general patient information, including gender, age, smoking cessation status, drug use, number of acute exacerbations, symptoms, possible causes of acute exacerbations, possible causes of no acute exacerbations, etc.; CAT questionnaire; mMRC questionnaire, etc. CAT and mMRC measurements was to be repeated every 3 months. On January 23 and March 31, 2020, the patients were followed up for CAT and mMRC scores, and some contents were adjusted according to the changes in epidemic prevention measures based on the original general information questionnaire.

Use SPSS25.0 statistical software for data analysis. Count data is expressed in percentage (%), normal distribution measurement data is expressed as mean ± standard deviation (`x±s), skewed distribution measurement data is expressed in median (interquartile range) [M(Q)] Said. The CAT symptom scores, total scores and mMRC scores before and after the epidemic were tested by K-M, and the differences were statistically significant ($p<0.05$), that is, non-normal distribution; Wilcoxon rank sum test of two related samples was used. Inspection level $\alpha=0.05$ (two-tailed inspection).

Results

Demographic and Clinical Characteristics

A total of 113 patients with stable COPD were included, 69 males (61.1%) and 44 females (38.9%). 29 cases (25.7%) aged 65-79 years old, 84 cases (74.3%) aged 80 years or older. 49 people (43.36%) smoked, 21 people (18.58%) did not smoke; 43 people (38.05%) had quit smoking, and an median of 7 (18) years had been quit smoking. In 2019, 56 people (49.6%) had COPD exacerbations (being hospitalized due to exacerbation of "cough and asthma") ≥1 times, and COPD exacerbation in 2019 (due to exacerbation of "cough and asthma" requiring outpatient or hospital infusion treatment) times ≥2 There were 29 people (24.7%). 67 people (59.3%) took regular drugs for an median of 2 (4) years. Comparison of CAT and mMRC scores before and after the epidemic (see Table 2).

Table 2. Comparison of CAT and mMRC before and after the NCP epidemic [M(Q)]

Entry	Before the epidemic	After the epidemic	*z*	*F*
Never cough	1 (3)	1 (2)	-2.019[b]	0.043*
No sputum at all	1 (2)	1 (2)	-.568[b]	0.570
No feeling of chest tightness	2 (2)	2 (2)	-.194[b]	0.846
Feeling of breathlessness when climbing or upstairs	2 (3)	2 (3)	-1.368[b]	0.171
Can do anything at home	2 (3)	2 (3)	-1.926[b]	0.054
Although I have lung disease, I am confident about going out	2 (3)	2 (3)	-.721[b]	0.471
Very good sleep	1 (2)	2 (2)	-.418[b]	0.676
Energetic	2 (2)	1 (2)	-2.514[b]	0.012
CAT total score	13 (15)	12(15.5)	-2.017[b]	0.044*
mMRC	1 (2)	1 (2)	-2.078[b]	0.038*

*p<0.05

Symptom control

After the epidemic lockdown, the cough symptoms, energy status, total score and mMRC score in the CAT questionnaire were lower than before the epidemic lockdown, and the difference was statistically significant (p<0.05).

Acute exacerbation

During the epidemic period (January 23-March 31), 28 people (24.8%) experienced acute exacerbations, of which 14 people (50%) experienced 1 exacerbation, 13 people (46.43%) exacerbated 2 times, and 3 or more exacerbations 1 People (3.57%). The symptoms of acute exacerbation were mainly asthma (89.29%), cough (64.29%), sputum (35.71%), and fever (10.71%). Five people (17.86%) changed the dose or frequency of inhaled drugs due to acute exacerbation. Seventeen (60.71%) improved after hospitalization, 4 (14.29%) improved after outpatient or community infusion therapy, 4 (14.29%) improved after oral medication, and 3 (10.71%) resolved spontaneously.

Patients believe that the causes of acute exacerbations include irregular medication (35.71%), inability to routinely see a doctor due to the impact of the epidemic (67.86%), lack of drugs due to the impact of the epidemic (28.57%), feeling nervous or anxious during the epidemic (25%), unable to go out Exercise (3.57%), 35.71% for other reasons.

During the epidemic period, 85 people (75.2%) did not experience acute exacerbations. The reasons for the absence of acute exacerbations included regular medication (60.34%), reduced cross-infection due to the epidemic (58.62%), and

wearing masks (21.55) %), vaccination (2.59%), smoking cessation (22.41%), other reasons (31.9%).

Discussion and Limitations

Discussion

The rapid outbreak of the novel coronavirus pneumonia has caused various levels of anxiety among the general public. A wide range of anxiety is more prone to panic. Studies have shown that people with poor physical conditions have more anxiety(Liu et al.,2020). Therefore, COPD patients who are in a state of respiratory disease all year round have more insecurity and fear during the epidemic than other people. In order to prevent and control the epidemic, strict home closed management was adopted. This measure effectively contained the development of the epidemic, but at the same time, it also changed the original living habits of most people. The epidemic information became the focus of public attention. The rapidly spreading network information has become the main source of information for the people during the closed management period. In the Internet media with low entry barriers, high information density, and wide coverage, the general public has a wide range of information sources and channels for information dissemination; false content emerges endlessly, and Internet rumors that can trigger emotional resonance are more interesting(Zhang et al., 2020). Research shows that the attention of anxious individuals is preferentially bias towards threatening materials (Sun et al., 2020). Therefore, the more frequently they pay attention to epidemic information, the more negative information they tend to see, and the more anxious the crowd will be. As a result of anxiety, people indulge the acquisition and spreading of more negative information. The inability to distinguish the authentic information from false information leads to insecurity, causing diffuse panic or anxiety in the group (Sun et al., 2020). Studies have shown that the CAT score of COPD patients is closely related to anxiety and depression (Hilman et al., 2018). In this study, the cough symptoms, energy status score, total score and mMRC score of the CAT questionnaire of COPD patients after the epidemic were lower than before the epidemic, indicating that mindfulness-based cognitive therapy can effectively reduce the anxiety and depression of patients, and the difference is statistically significant ($p<0.05$). Online mindfulness-based cognitive therapy can effectively relieve anxiety and panic in COPD patients.

Through the Internet of Things platform, it provides patients with various and standardized COPD disease knowledge, drug inhalation skills, exercise methods, home oxygen therapy, nutrition management and other authoritative health information. Patients can maintain the accuracy and continuity of knowledge through repeated learning. Through the medication reminder service on the patient side,

remind patients to take medication regularly and complete rehabilitation training, and improve their self-management awareness and ability. With the help of the IoT platform, the multidisciplinary team can comprehensively evaluate the health status of COPD patients and formulate targeted rehabilitation prescriptions. COPD patients use IoT devices to implement rehabilitation training in accordance with rehabilitation prescriptions and upload data to the Internet of Things. The multidisciplinary team analyzes historical trends through the Internet of Things platform to grasp the implementation of patients' pulmonary rehabilitation. Avoid patients' lack of health guidance and supervision at home, resulting in reduced compliance and affecting the quality of life. Epidemic prevention measures help prevent the acute exacerbation of COPD.

January-March 2020 is the coldest season in Hubei, and it is the season of acute exacerbation of COPD. In 2019, 85 people in the study population experienced acute exacerbations, while only 28 people experienced acute exacerbations during the epidemic control period. Although data for the same period cannot be statistically analyzed, it can indicate that the incidence of acute exacerbations during the epidemic control period is not high. During the period of closed community management and control of the epidemic, people are not allowed to go out, eat together, and gather with friends at will, reducing the chance of cross-infection. Due to the strict control of hand tools and plant shutdowns, the chance of air pollution has been greatly reduced. During the epidemic, people must wear masks when going out, pay attention to hand hygiene, and open windows for ventilation. In summary, the epidemic prevention measures have played a positive role in reducing the acute exacerbation of COPD. Home management can effectively improve the symptoms and health of COPD patients, and improve self-management ability.

The ethical review system is an important measure to protect the health and safety of subjects and researchers. The outbreak of the NCP epidemic poses a challenge to the traditional ethical review process in view of the timeliness and urgency of the research. This study did not get enough time for ethical review and scientific demonstration of research design. Therefore, according to the practical experience of this epidemic, we should actively explore the standard process of clinical nursing research ethics review during public health emergencies to avoid risks caused by human factors (Geng et al., 2020). A work process for ethical review of clinical nursing research should be formulated for public health emergencies.

Limitations

The research subjects included in this study need to use smart phones to operate. Most COPD patients are middle-aged and elderly people. Those who cannot use smart phones are not included in the study, which has limitations. The research time is relatively short, and there is no further exploration and research on the long-term physiological and psychological effects of COPD patients during the post-new

coronavirus pneumonia epidemic. In the future, we will follow the symptom control of these patients further. More stable COPD patients were recruited for the RCT study to explore the effects of online MBCT on anxiety, depression, mindfulness levels, pulmonary rehabilitation compliance, and symptom control in stable COPD patients.

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Authors' contribution

Lin Xie: Conceptualization, design, Literature retrieval, Revision.
X**iaosun Sun:** Literature retrieval, Data collection, Writing-Original Draft.
Xue Feng: Literature retrieval, Design, Data analysis,Writing-Review and Editing.
Xingtao Xia: Data collection.
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