

Review Article

Research progress in nonpharmacological respiratory management during the stable-phase of chronic obstructive pulmonary disease

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Abstract: Nonpharmacological respiratory management can reduce the exacerbation and hospitalization frequency of stable patients with chronic obstructive pulmonary disease, improve their quality of life, as it is a very important intervention measure. However, currently, drug control is the main focus, and there is a lack of systematic non-pharmacological respiratory management for patients, which has become an urgent problem to be solved in line with drug treatment. This article reviews the progress of nonpharmacological respiratory management research in the stable phase of chronic obstructive pulmonary disease, aiming to identify the advantages and make up for the shortcomings of current research, in order to provide reference for clinical work and subsequent research.

Keywords: Chronic obstructive pulmonary disease, stable phase, non-pharmacological respiratory management, review

Introduction

Chronic obstructive pulmonary disease (COPD) is a common respiratory disease, which is a preventable and treatable disease with continuous airflow obstruction and restriction. It is recorded by spirometry; and it is related to abnormal inflammatory reactions caused by harmful particles or gases in the lungs [1, 2]. COPD affects nearly 400 million people worldwide, and according to the World Health Organization's prediction, COPD will rank third among the global causes of death by 2030 [3].

COPD patients spend most of their time in a stable state of COPD, so the management of the stable periods is particularly important. According to the "Guidelines for the Diagnosis and Treatment of Chronic Obstructive Pulmonary Disease" (revised in 2013), the stable period of COPD refers to the stable or mild symptoms of cough, expectoration, and shortness of breath in patients, and the condition basically returns to this state before acute exacerbation [4]. The GOLD Reports point out

that regularly inhaling various drugs through inhalation devices to control disease progression and alleviate symptoms is the core of COPD disease management [5]. By effectively regulating the use of inhalation drugs, the disease can be prevented from further worsening, symptoms can be alleviated, and the number of acute exacerbations of COPD can be reduced [6]. However, a prospective study showed that only 22.9% of Irish COPD patients were able to use inhaled drugs on time to control the course of the disease. Research in China has shown that there are still great difficulties in standardizing the treatment of COPD, with a standardized treatment rate of less than 5% and poor patient compliance of only 21% [7].

At present, drug control leads to symptom relief, but it cannot fundamentally solve the problem. Therefore, non-drug respiratory intervention plays a crucial role in the management of stable chronic obstructive pulmonary disease. It can work together with drug therapy to control disease progression, improve patient quality of life, and regulate body status. The purpose of

this study is to effectively reduce the incidence of disease exacerbation and hospitalization and improve lung function by strengthening non-drug respiratory management in stable COPD patients. At present, non-drug respiratory management for stable COPD patients includes patient health education, smoking cessation, vaccination, lung rehabilitation, psychological support, physical and mental health and traditional Chinese medicine therapy, singing, and if necessary, home oxygen therapy. These non-drug interventions are items that patients can accept and easily adhere to, which can help improve patient treatment compliance, improve physical and mental health, and regulate body function.

This article aims to review the research progress of non-drug respiratory management in stable COPD patients, with the aim of providing reference for clinical practice.

Health education

Comprehensive health education and guidance for patients, such as explaining and demonstrating the use of drug inhalers, can improve their self-management ability and confidence, enhance the importance of the disease, and enhance their self-efficacy in controlling it. Medical staff develop personal action plans for patients, support and urge patients and their families to self-manage, and also facilitate the accurate and full use of drugs. Kim et al. believe that health education should not only be limited to diseases and drug use [8], but also focus on the construction of patients' positive psychology and mindfulness towards diseases [9]. Meanwhile, Keogh et al. believe that malnutrition can have a negative impact on exercise, muscle function, and lung function, increasing the chance of worsening the condition, mortality rate, and cost, and affecting multiple aspects of COPD. However, after nutritional treatment, many benefits can be obtained, and the body can also achieve short-term improvement. Therefore, the health education management plan also needs to evaluate the patient's nutritional status and supplement nutrition to increase the body's motor function [10]. If nutritional supplementation is combined with exercise rehabilitation training, there will be greater benefits [11].

From this, it can be seen that comprehensive and systematic health education guidance

should include multiple aspects, rather than just treatment related to the disease itself. Medical staff can fully utilize the advantages of the Internet, use various methods such as videos, animations, and demonstrations to conduct health education, actively guide patients to maintain an optimistic and positive attitude, pay attention to nutrition supplementation and monitoring, and establish a healthy lifestyle.

Quit smoking

Quitting smoking is a very important intervention measure for COPD patients. One of the control goals for stable COPD is to reduce the number of acute episodes. When a person's immune system decreases, it is easy to develop respiratory infections, leading to worsening of the disease. Quitting smoking can reduce acute COPD episodes. After quitting smoking, the levels of immune components such as CD3+ and CD4+ can be increased, while the levels of CD8+ can be reduced, thereby enhancing local respiratory immunity and improving quality of life. Smoking is the main cause of COPD, therefore, among all interventions for COPD, quitting smoking has the greatest impact on the natural history of COPD. However, tobacco dependence is a chronic disease, and quitting smoking is not easy. Smokers may need multiple treatments to achieve long-term or permanent cessation [12]. However, through bonus rewards, healthy behavior can be promoted, and smoking cessation efficiency can be improved [13].

According to a prospective cohort study, intensive brief smoking cessation counseling and guidance by doctors or healthcare professionals can increase smoking cessation rates [14]. Clinical healthcare providers should encourage all smokers with COPD to quit smoking and guide healthcare professionals and patients to jointly develop a smoking cessation action plan. Medical staff adhering to smoking cessation guidance can maximize the smoking cessation rate. Research has shown that combining counseling plans with medication treatment is the most effective strategy to help patients quit smoking [15]. Moreover, there is a strong dose-response relationship between the intensity of tobacco dependence counseling and its effectiveness. At the same time, increasing social support is also beneficial for treatment, and if necessary, first-line drug treatment can be supplemented [16]. Quitting smoking also

includes many important clinical benefits, such as increasing sensitivity to bronchodilators, reducing the rate of lung function decline, and reducing mortality [17]. Therefore, medical staff should fully mobilize patients and their families to participate in the formulation and implementation of smoking cessation plans, provide planned consultation and guidance, and improve the success rate of smoking cessation.

Vaccination

A multiple regression analysis shows that both pneumococcal and influenza vaccines are beneficial for preventing acute exacerbation of COPD and improving symptoms. However, the current vaccination rate in China is still very low, with only 10.9%, 1.7%, and 9.6% of COPD patients receiving influenza vaccine in tertiary hospitals, and 21.8%, 6.9%, and 32% of COPD patients receiving pneumococcal vaccine [18].

Respiratory infections are the most common cause of COPD exacerbations, and pneumococcal and influenza vaccinations can reduce the risk of lower respiratory tract infections [19]. Fiore et al. believe that receiving the influenza vaccine can also reduce the length of hospital stay and death caused by lower respiratory tract infections in COPD patients [20]. In addition, although there are few studies evaluating exacerbation of COPD, the number of exacerbations in vaccinated COPD patients appears to be significantly reduced compared to patients receiving placebo [21]. This suggests that vaccination can reduce the chances of worsening in patients. In addition, a population-based study has shown that patients with chronic obstructive pulmonary disease, especially the elderly, have a reduced risk of heart related diseases among patients receiving influenza vaccines, and even if they suffer from cardiovascular related diseases, symptoms are usually milder and more transient. Therefore, researchers recommend that all stable COPD patients receive influenza vaccine annually [22]. The combination of the influenza vaccine and 23-valent pneumococcal polysaccharide vaccine (PPV23) has a more significant protective effect [23]. Professional guidelines also recommend that all patients with COPD need to be vaccinated against influenza [24]. Overall, vaccination has been shown to reduce the risk

of exacerbation of COPD and is recommended for use in COPD patients. However, there is insufficient evidence to compare which type of vaccine is best for these patients, and more clinical studies are needed for COPD patients [25]. From this, it can be seen that medical personnel should strengthen the scientific publicity on the necessity of vaccination and encourage COPD patients to actively receive it.

Pulmonary rehabilitation (PR)

Pulmonary rehabilitation (PR) was first applied in practice by Thomas Petty in the late 1960s [26]. Since Tom Petty organized the first multidisciplinary team for lung rehabilitation in 1986, the project has been widely applied elsewhere within a few years. The GOLD (Global Initiative Guidelines for Chronic Obstructive Pulmonary Disease) statement suggests that lung rehabilitation is a Class A method for improving symptoms in COPD patients [27]. It has been established as the standard of care for symptomatic COPD patients. Lung rehabilitation is an important part of COPD disease management, which can alleviate patients' breathing difficulties, reduce fatigue, improve negative emotions, enhance disease control through exercise, and thereby improve patients' quality of life and exercise ability [28]. It can also effectively alleviate symptoms, improve health status, and exercise tolerance in COPD patients [29]. The benefits of lung rehabilitation include improving lung function, breathing difficulties, and quality of life, and the magnitude of these benefits is usually greater than any other COPD treatment [30, 31]. Traditional lung rehabilitation programs include fitness exercises, resistance breathing muscles, and relaxation training. In recent years, the combination of lung rehabilitation and modern technology has achieved good results. For example, the lung rehabilitation program combined with VR (non-immersive virtual display training) training is an auxiliary technology for physical rehabilitation that allows patients to participate in virtual games in the form of biofeedback. It improves the physical fitness of COPD patients by improving exercise performance, and its effect is better than traditional lung rehabilitation training [32]. Therefore, medical staff should teach patients and their families the methods of lung rehabilitation in clinical work, clarify their important significance, inform patients to persist

in lung rehabilitation training during hospitalization and after discharge, and promote disease recovery.

Psychological support

The prevalence of anxiety and depression in COPD patients is high. A case-control study showed that the levels of depression and anxiety in COPD patients were higher than those in the healthy control group [33, 34]. The presence of depressive symptoms in COPD patients is associated with increased disease exacerbations, a decrease in physical activity, an increase in breathing difficulties, and a deterioration in quality of life, indicating that depression can exacerbate the progression of COPD [35]. A nationwide multicenter cross-sectional study demonstrated that higher levels of anxiety and depression lead to more severe disease progression outcomes in COPD, such as decreased quality of life, worsened symptoms, increased severity and frequency of respiratory difficulties, and increased complexity of the condition. Additionally, it was found that adult females are more prone to anxiety and/or depression [36]. This may be related to the tendency of women to express emotions through language and communication, and high life pressure. It can also be speculated whether anxiety and depression are related to estrogen, which requires further research in the future. Beijers et al. believe that the degree of lung and physical health limitations in young and elderly patients with severe airflow limitations is roughly the same, and the proportion of young patients with mental problems is higher [37]. This phenomenon may be related to the life pressure borne by young people in a fast-paced society compared to the elderly, which reminds healthcare professionals to pay more attention to the psychological status of middle-aged and young COPD stable patients, especially young patients and women. In addition, depression may also be an independent factor in the acute exacerbation of chronic obstructive pulmonary disease (AECOPD), therefore, early detection and application of multidisciplinary methods can improve anxiety and depression, and reduce the occurrence of AECOPD [38]. Another study shows that some patients or general practitioners believe that psychological support is not needed [39]. This may be related to the fact that the research subjects in this study are mostly general practitioners at the grassroots level, who bear a heavy medical burden and

have limited energy and medical conditions. The research subjects are mostly grassroots people, and their cognitive range of diseases is limited.

Physical and mental health and traditional Chinese medicine therapy

Traditional Chinese medicine sports are a long-standing health and wellness exercise that has been widely accepted by the general public and is a widely used non-drug intervention method. They have played a crucial role in the health and wellness of the people in Chinese history.

Li Tao et al. [40] have shown that continuous practice such as Tai Chi and Baduanjin can effectively improve lung function in stable COPD patients after a period of time. Among them, Tai Chi can also reduce serum inflammatory factor levels and improve quality of life scores [41]. Another systematic review shows that Tai Chi, fitness qigong, and yoga can also reduce anxiety and depression levels in COPD patients [42]. A large-scale survey conducted domestically and internationally shows that many patients are unwilling to engage in vigorous exercises such as lung rehabilitation due to shortness of breath, while milder exercises such as Tai Chi, Qigong, and walking are more favored by patients [43]. However, it is undeniable that this type of mild exercise may not be as effective in building endurance and strength as other forms of exercise commonly used in lung rehabilitation therapy [44]. Therefore, for patients with moderate physical strength, it is recommended that they engage in lung rehabilitation exercises within their capabilities, and may be helpful for those with slightly weaker physical strength who cannot tolerate moderate traditional Chinese physical therapy.

From this, it can be seen that traditional Chinese sports therapy can to some extent be beneficial for respiratory management and physical and mental health of COPD patients. Due to its low price, easy operation, and small adverse reactions, it can be included in effective respiratory management for stable COPD patients, and can be promoted and applied in clinical practice in the future.

Singing

Due to the need for precise management of respiration, airflow, and sufficient lung capaci-

ty, singing can increase lung capacity, reduce residual volume, and enhance respiratory muscles, making it an adjunctive treatment for COPD [45]. A meta-analysis based study showed that singing not only improved respiratory muscle (PEmax), but also improved the quality of life (SF-36PCS) score in COPD patients [46].

Discussion

This study summarized the management measures for non-drug respiratory tract treatment in stable COPD patients from 8 aspects: patient health education, smoking cessation, vaccination, lung rehabilitation, psychological support, physical and mental therapy, traditional Chinese medicine therapy, and singing. These measures can reduce COPD complications, exacerbate COPD stable phase, and hospitalization times, thereby improving the quality of life of patients. However, most of the evidence currently comes from cross-sectional studies and cannot determine the potential causal relationship between exacerbation of COPD during stable phase and respiratory tract. In the future, large-scale multidisciplinary longitudinal studies can be conducted to clarify the factors related to respiratory tract during stable phase of COPD. Scientific and standardized non-drug respiratory management in stable COPD requires the joint efforts of multidisciplinary specialized teams, patients, and their support forces. Based on multiple measures for non-drug respiratory management, network and mobile medical platforms can be used to guide medical staff to develop action plans through multidisciplinary cooperation, in order to cultivate the self-management ability and awareness of stable COPD patients, improve their prognosis and quality of life.

There are still shortcomings in this study. Some non-drug interventions lack large sample, multicenter, and double-blind randomized studies, which can have a certain impact on the accuracy of experimental results. In future research, methods need to be improved to improve the objectivity and authority of data results. For these non-drug therapies, although some are recommended by GOLD, further research is needed on their specific implementation and effective use, and further exploration is needed in future research.

Disclosure of conflict of interest

None.

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