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Nursing Research of Chronic Obstructive Pulmonary Disease (COPD)

Wenli Liu

Shanxi Provincial People's Hospital, Taiyuan, Shanxi, China
283277227@qq.com

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Abstract: Chronic Obstructive Pulmonary Disease (COPD) is a long-term respiratory disease characterized by airflow restriction, which significantly affects patients' quality of life and survival. In recent years, due to the aging of the population structure and the deterioration of environmental quality, the incidence of COPD has continued to rise, posing a major challenge in the field of global public health. This review aims to explore recent advances in COPD care research, with a particular focus on nursing interventions, patient self-management education, interdisciplinary collaborative models, and the use of emerging technologies. Existing evidence shows that appropriate nursing intervention can not only significantly relieve patients' clinical symptoms, reduce the frequency of acute attacks, but also improve their quality of life.

1. Introduction

1.1 Research background and significance

1.1.1 Epidemiological characteristics of chronic obstructive pulmonary disease (COPD)

Chronic obstructive pulmonary disease (COPD) is a long-term respiratory disease characterized by persistent airflow restriction, with high morbidity and mortality rates worldwide. According to statistics provided by the World Health Organization (WHO), COPD is the third leading cause of death worldwide, claiming more than three million lives each year. Particularly in low - and middle-income countries, the prevalence of the disease is significantly higher than in developed countries, due to factors such as high air pollution, widespread smoking and relatively inadequate medical facilities. Epidemiological studies have further pointed out that the incidence of COPD shows a clear upward trend with age, especially in people over 40 years of age. In addition, the proportion of men with the disease is generally higher than that of women, which may be attributed to men's higher frequency of smoking and greater risk of occupational hazards.[1]

The epidemiological characteristics of chronic obstructive pulmonary disease (COPD) are significantly different in different regions. In regions with higher levels of industrialization, the incidence of the disease is relatively high due to factors such as air pollution and occupational environmental exposure. In contrast, in rural areas, the use of biomass fuels leads to a decline in

indoor air quality, which is also an important factor in COPD. In addition, it was observed that the incidence and mortality rate of COPD in the lower socioeconomic status group was significantly higher than that in the higher income group, which was closely related to their limited access to medical resources, weak health awareness and unhealthy daily living habits.

The epidemiology of chronic obstructive pulmonary disease (COPD) is also characterized by its frequent recurrence and acute exacerbation. These acute episodes not only accelerate the decline of lung function in patients, but also lead to significant increases in hospitalization and mortality. According to the study, acute exacerbations occur approximately one to three times per year per person with COPD, and in severe acute exacerbations, the mortality rate can be as high as 20%. In view of this, prevention of acute exacerbations has become a key component of COPD management strategies.

In summary, the epidemiological characteristics of chronic obstructive pulmonary disease (COPD) highlight its importance as a global public health challenge. Given that the disease has a high morbidity and mortality, and shows significant differences in different regions and populations, this brings great difficulties to the prevention and control of the disease.[2] In-depth investigation of the epidemiological characteristics of COPD can not only provide a basis for the formulation of effective preventive measures, but also lay a solid scientific foundation for clinical treatment and nursing practice, thereby improving the quality of life and health outcomes of patients.

1.1.2 Impact of chronic obstructive pulmonary disease on patients' quality of life

Chronic obstructive pulmonary disease (COPD) has multiple negative impacts on the quality of life of patients across multiple levels of physical, psychological and social functioning. Due to the persistent airflow restriction and difficulty breathing caused by the disease, patients' ability to perform daily activities is severely affected, and even basic movements such as walking or walking up and down stairs can trigger severe breathing problems that limit their freedom of movement.[3] This physical decline not only impairs individuals' ability to perform tasks independently, but also increases their need for support from family members and the wider community, which in turn increases mental stress. Studies have shown that people with COPD score lower than healthy individuals on measures of quality of life, particularly in areas such as physical health, emotional state and social interaction.

On a psychological level, individuals with chronic obstructive pulmonary disease (COPD) often experience emotional distress with anxiety and depression. This emotional response stems mainly from the irreversible nature of the disease and its frequent acute episodes, leading to uncertainty about the future and a fear of death. The constant psychological burden not only impairs the patient's psychological well-being, it may also exacerbate the condition through neuroendocrine pathways, creating a negative feedback loop.[4] In addition, because breathing difficulties limit social activities, patients' social support networks gradually shrink, which further deepens their feelings of loneliness and powerlessness. From the point of view of social functioning, COPD adversely affects an individual's ability to work and economic status, increasing the likelihood of unemployment. The combination of economic stress and reduced social status significantly reduced the quality of life of patients.

The impact of chronic obstructive pulmonary disease (COPD) on the families of patients is also of concern. Family members often need to take on additional nursing responsibilities, and caring for patients for a long time may make caregivers feel physically and mentally exhausted, and even lead to "caregiver burnout" phenomenon. This additional family burden not only reduces the quality of life of family members, but also may lead to tension within the family and increase conflict. Therefore, COPD is not only a personal health problem, but also a problem that touches the whole family and even the level of society.

In the field of care, improving the quality of life of patients with chronic obstructive pulmonary disease (COPD) is a key objective. Through a series of comprehensive nursing interventions, such as respiratory function training, psychological counseling and social resources integration, patients' living conditions can be significantly improved. Specifically, intensive training in respiratory function helps to improve patients' lung health and physical endurance, which in turn promotes their ability to take care of themselves in their daily lives. In addition, psychological support services, such as individual counseling and cognitive behavioral therapy, can effectively alleviate patients' negative emotions and enhance their mental resilience in the face of the challenges of the disease. At the same time, connecting patients with relevant social resources and providing support in the form of career guidance and financial assistance is important to reduce their financial burden and help them better integrate into society.

In addition, home care plays a vital role in improving the quality of life of patients with chronic obstructive pulmonary disease (COPD). By educating family members to understand the relevant knowledge and nursing skills of COPD, it can not only improve the level of nursing, but also help to reduce the pressure of the family and enhance the relationship within the family. Support at the community level focuses on building mutual support networks and providing health guidance and rehabilitation services to promote patients' social inclusion and further improve their quality of life.

In general, the impact of chronic obstructive pulmonary disease (COPD) on patients' quality of life is comprehensive, covering multiple levels of physical, psychological and social functioning. In nursing practice, the adoption of comprehensive nursing measures, combined with family and community supportive care, can significantly improve the quality of daily life of patients and promote their overall health status. This process not only helps to enhance the survival experience of patients, but also reduces the pressure on families and society, which has far-reaching public health value.

2. Theoretical basis of chronic obstructive pulmonary disease nursing

2.1 Application of nursing theory in COPD

2.1.1 Holistic nursing theory

The concept of holistic care applied to the management of patients with chronic obstructive pulmonary disease (COPD) emphasizes the individual-centered care approach, aiming to fully meet the patient's physical, psychological, social and spiritual needs. As a long-term, progressive health condition, COPD not only impairs respiratory function, but also has a significant impact on patients' quality of life, emotional state and social skills. The core value of this care model is to help patients effectively face the challenges caused by the disease through the implementation of cross-disciplinary and multi-level support measures, so as to promote the improvement of their overall health status.

From a physiological point of view, the theory of total nursing focuses on the comprehensive assessment and intervention of the patient's respiratory function. For individuals with chronic obstructive pulmonary disease (COPD), they often face problems such as difficulty breathing, coughing, and coughing up phlegm. Therefore, nursing staff need to design personalized breathing exercise programs according to the specific conditions of each patient, such as abdominal breathing or lip contraction breathing techniques, in order to promote the improvement of their lung function. In addition, providing effective management of medication is also an integral part of the overall care strategy. Health care providers should instruct patients on the proper use of inhaled medications to ensure maximum effectiveness while minimizing the risk of potential side effects. In addition, nutritional support and weight control are also one of the key links in the whole care process. Because poor breathing can lead to decreased appetite and weight loss in patients with COPD, nurses need to tailor dietary recommendations to patients' current nutritional status to help them maintain good

physical condition.

From the perspective of mental health, the theory of holistic care particularly emphasizes the attention paid to the mental state and emotional health of patients. People with chronic obstructive pulmonary disease (COPD) often experience negative emotions such as anxiety or depression due to physical discomfort caused by the disease, as well as a significant decrease in quality of life. In this case, medical staff need to take a variety of means, including psychological counseling and support, to reduce the inner pressure of patients, and enhance their courage and faith in facing the disease. In addition, we should also pay attention to the patient's family environment and promote the participation of family members in the patient's care process, so as to provide patients with more comprehensive emotional support and life assistance.

From a social perspective, the holistic care model focuses on patient sociability and engagement. People with chronic obstructive pulmonary disease (COPD) tend to reduce their social activities due to the effects of the disease, which increases the feeling of being socially isolated. Medical staff should promote these patients to re-participate in social activities by establishing an effective social support system, so as to improve their social status. For example, patients can be advised to join support groups specifically for people with COPD, where they can share their experiences and emotions with others going through similar challenges to strengthen their sense of community.

3. Clinical nursing practice of chronic obstructive pulmonary disease

3.1 Nursing of stable COPD patients

3.1.1 Respiratory function training

When patients with chronic obstructive pulmonary disease (COPD) are in the stable stage, respiratory function training is an integral part of the care process. The training is designed to improve the patient's ability to breathe, increase their lung capacity, and reduce symptoms of dyspnea through a series of carefully designed methods, ultimately achieving the purpose of improving the patient's daily quality of life. The key to this training is to teach patients specific breathing techniques and exercises to optimize their breathing patterns, strengthen the strength and endurance of the breathing muscles, and thus promote more efficient gas exchange.

The core methods of respiratory function training include deep abdominal breathing, lip narrowing breathing and respiratory muscle exercise. Among them, abdominal deep breathing is designed to enhance respiratory efficiency by strengthening diaphragm activity. Specifically, the method instructs the individual to actively regulate the contraction and relaxation of the abdominal muscles, causing the diaphragm to fall, and thereby expanding the chest volume to take in more oxygen. This breathing technique helps to significantly reduce breathing rate, reduce breathing burden, and relieve symptoms of poor breathing. Lip narrowing breathing, on the other hand, allows the patient to gently close the lips during exhalation to prolong the exhalation process, increase the internal pressure of the respiratory tract, prevent the small airway from closing prematurely, and thus optimize the efficiency of gas exchange. This method is especially beneficial for people with chronic obstructive pulmonary disease (COPD), because such patients have greater respiratory resistance and shorter natural exhalation times, which tend to cause gas accumulation in the body.

In the process of respiratory function training, medical staff need to design personalized training programs according to the specific conditions of each patient. The frequency, intensity, and duration of training should be adjusted flexibly according to the patient's adaptive capacity and the development of the disease. During this time, health care professionals need to pay close attention to the patient's breathing rate, blood oxygen saturation, and personal feelings, and adjust the training plan accordingly to prevent the patient from becoming overtired or uncomfortable. In addition,

patients and their families should also explain the basic principles of respiratory function training, specific operation methods and related precautions in detail to ensure that patients can accurately grasp the relevant skills and integrate them into daily life.

Respiratory function training not only helps to improve the physiological function of patients with chronic obstructive pulmonary disease (COPD), but also enhances their mental health and self-efficacy. Through systematic exercise, patients can more effectively regulate their breathing process, reduce the need for oxygen therapy and medical support, and promote the growth of personal confidence and independence. In addition, such training also helps to strengthen the interaction between patients and medical staff, build a positive and harmonious doctor-patient relationship, and lay a solid foundation for long-term health management of patients.

In summary, respiratory function training is an integral part of the care plan for patients with stable chronic obstructive pulmonary disease (COPD). By following scientific guidelines and implementing a systematic exercise regimen, patients can significantly improve their breathing efficiency, reduce symptoms of poor breathing, and enhance their quality of life. In this process, healthcare professionals should aim to provide personalized, organized and continuous support measures to ensure the safety and effectiveness of training activities, thereby laying a solid foundation for long-term health management of patients with COPD.

3.1.2 Drug therapy management

When patients with chronic obstructive pulmonary disease (COPD) are in a stable stage, medication management is a core part of care. Its main goal is to control the symptoms of patients, delay the deterioration of the disease, reduce the number of acute attacks, and ultimately achieve the purpose of improving the quality of life of patients. For the treatment of COPD, drugs commonly used include but are not limited to bronchodilators, inhaled corticosteroids, and phosphodiesterase-4 inhibitors. In this process, health care professionals need to pay special attention to how to choose the right drugs, provide the correct guidance for use, regularly evaluate the effects of drugs, and effectively prevent and deal with various possible side effects.

Bronchodilators form the basis of drug therapy for chronic obstructive pulmonary disease (COPD) and are mainly divided into two types: short-acting and long-acting. The former is mainly used for immediate relief of acute symptoms, while the latter is more suitable for long-term management to maintain a stable condition. The medical staff should give patients a comprehensive introduction to the working principle of these drugs, the correct use method and the relevant precautions, especially the operation guidance on the inhalation device is crucial. Mastering effective inhalation techniques is decisive to ensure the efficacy of drugs; Therefore, through demonstration and repeated practice, the nursing staff must ensure that each patient can perform the inhalation step independently and accurately. In addition, it is important to regularly check the patient's inhalation skills and correct any deviations in time to prevent inadequate doses or unnecessary side effects due to improper procedures.

3.2 Nursing of patients with acute exacerbation of COPD

3.2.1 Rapid identification and evaluation

In the care of patients with acute exacerbations of chronic obstructive pulmonary disease (COPD), it is critical to quickly identify and evaluate changes in symptoms. Patients with COPD are defined as entering an acute exacerbation phase when their symptoms worsen beyond the normal fluctuation range, and the original treatment plan needs to be adjusted to cope with the change in the condition. The focus of nursing work at this stage is to be able to catch subtle changes in the patient's state in time, accurately judge their health status, and take appropriate measures to prevent further

development of the disease. In order to achieve this goal, healthcare professionals must possess keen insight and a high level of expertise so that they can intervene in the early stages of the disease, thereby effectively reducing the risk of complications, reducing the need for hospitalization services, and reducing mortality.

The key to effectively identify the acute exacerbation of chronic obstructive pulmonary disease (COPD) lies in the comprehensive monitoring of patients' clinical manifestations. When the condition worsens, common features include increased difficulty breathing, increased frequency of coughing, increased sputum volume or changes in sputum quality (such as yellow or green color), and worsening chest tightness or wheezing symptoms. Medical personnel should collect relevant information through various ways such as daily visits, direct questioning of patients' feelings and the opinions of their family members, so as to catch the signs of changes in these symptoms in time. Vital signs such as breathing rate, heart rate, oxygen saturation level in the blood, and body temperature should also be closely tracked, as changes in these indicators often indicate a deterioration in health. For those individuals who use home-based oxygen therapy, the care provider also needs to regularly check the effectiveness of the treatment, ensure that the oxygen supply device is in good working condition, and adjust the oxygen supply according to the patient's specific situation.

In summary, for patients with chronic obstructive pulmonary disease (COPD) in the stage of acute exacerbation, rapid and accurate identification and assessment of their condition is a critical step in the care process. Health care professionals should use comprehensive symptom monitoring, standardized evaluation tools, and interdisciplinary cooperation mechanisms to detect changes in patients' health status in a timely manner and take effective interventions accordingly to promote patients' recovery and improve their quality of life. During this period, the professional skills and teamwork spirit of the nursing staff are particularly important, providing solid support for the effective management of the acute exacerbations of COPD patients.

3.2.2 Oxygen therapy and respiratory support

Oxygen therapy and respiratory support play a critical role in the care of patients with acute exacerbations of chronic obstructive pulmonary disease (COPD). When these patients experience deterioration, it is often accompanied by severe hypoxemia and hypercapnia. By giving appropriate oxygen therapy, hypoxia can be effectively corrected and oxygen supply to tissues can be improved. Healthcare professionals should design personalized oxygen delivery strategies based on an individual's specific conditions, such as their blood oxygen saturation (SpO2) and arterial blood gas analysis. For those with only mild hypoxia, a lower flow of oxygen is usually administered with a nasal catheter or mask, with a recommended flow rate of 1-2 L/min and a target SpO2 level of 88 to 92 percent. In cases of moderate to severe hypoxemia, higher flow oxygen delivery methods or non-invasive positive pressure ventilation (NPPV) are needed to quickly relieve hypoxia and prevent physical damage caused by hypoxia. Throughout the treatment process, medical personnel must continue to pay attention to the changes in the patient's SpO2 value, respiratory rate and level of consciousness, and adjust the oxygen supply timely to ensure that it is neither excessive nor insufficient, so as to avoid possible side effects such as oxygen poisoning.

4. Conclusion

Self-management training is an integral part of COPD care and helps to slow the progression of the disease by enhancing patients' awareness of the disease and their self-care skills. In addition, cross-professional team collaboration has shown outstanding advantages in the integrated treatment of COPD, which provides patients with customized care plans by integrating medical resources in different fields. New technologies, such as telemedicine services and mobile health applications,

provide convenient and efficient health management tools for COPD patients, further enhancing the effectiveness of care. The purpose of this paper is to provide reference information for clinical nursing practice and promote the in-depth exploration of COPD nursing research.

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