

## **CASE STUDY OF NURSING CARE IMPLEMENTATION IN COPD PATIENTS WITH INDEFECTIVE BREATHING PATTERNS AND INDEFECTIVE AIRWAY CLEARANCE**

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### **ABSTRACT**

Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable, and manageable chronic lung disease that affects both men and women worldwide. Abnormalities in the small airways of the lungs cause limitations in airflow entering and leaving the lungs. COPD is sometimes referred to as emphysema or chronic bronchitis. To evaluate nursing care for COPD patients at Wellness Hospital Okinawa, Japan. This scientific paper used a case study method with a nursing care approach involving two respondents who were treated at Wellness Hospital Okinawa, Japan. Data collection was conducted using nursing care documentation, including assessment, diagnosis, intervention, implementation, and evaluation. Based on data analysis obtained from the assessment results, good observational and communication skills were required to support the establishment of accurate nursing diagnoses according to the patient's condition. Nursing diagnoses were identified in the patients. Nursing care plays an important role in improving breathing patterns and airway clearance in COPD patients. Appropriate nursing interventions can reduce dyspnea and help improve respiratory function, thereby enhancing the patient's quality of life.

Keywords: airway clearance; breathing pattern; COPD; nursing care

### **INTRODUCTION**

Chronic obstructive pulmonary disease (COPD) is a common, preventable, and manageable chronic lung disease that affects men and women worldwide. Abnormalities in the small airways of the lungs cause limitations in airflow into and out of the lungs. COPD is sometimes referred to as emphysema or chronic bronchitis (Venkatesan, 2023). Emphysema is a condition referring to the damage occurring in the alveoli, whereas chronic bronchitis is a chronic cough that occurs alongside sputum production due to airway inflammation. COPD and asthma share similar symptoms (cough, wheezing, and difficulty breathing), and individuals may have both conditions (WHO, 2022).

Over the next 30 years, the prevalence of COPD is projected to increase, and by 2030, an estimated 4.5 million people will die annually due to COPD. Available data indicate that COPD-related morbidity increases with age and is higher in men compared to women (GOLD, 2023). According to the WHO (World Health Organization), COPD is the third leading cause of death worldwide, causing 3.23 million deaths in 2019. Nearly 90% of COPD deaths in those under 70 years of age occur in Low- and Middle-Income Countries (LMICs) (WHO, 2022).

### **METHOD**

This scientific paper utilizes a case study method with a nursing care approach involving two respondents treated at Wellness Okinawa Hospital, Japan. Data collection was conducted using a nursing care format, which includes assessment, diagnosis, intervention, implementation, and evaluation.

## RESULT AND DISCUSSION

The results of nursing care for Mr. I, a patient with Chronic Obstructive Pulmonary Disease (COPD), showed an improvement in his condition after nursing interventions were carried out for  $3 \times 24$  hours. During the initial assessment on February 1, 2025, the patient experienced an ineffective breathing pattern, characterized by the use of accessory muscles for breathing, a respiratory rate of 28 breaths per minute (tachypnea), and an oxygen saturation ( $\text{SpO}_2$ ) of 94%. The patient was also using a nasal cannula with an oxygen flow of 4 liters per minute.

On February 5, 2025, an ineffective airway clearance was identified, characterized by airway hypersecretion, rhonchi (+/+), the patient's inability to cough effectively, a decreased level of consciousness with a GCS score of 13 (E3M6V), a respiratory rate of 28 breaths per minute, and an oxygen saturation of 94%.

After implementing nursing interventions—which included respiratory monitoring, airway management, semi-Fowler positioning, breathing exercises, education, and collaboration in medical therapy—the evaluation results showed an improvement in the patient's condition. The respiratory rate became more regular, the use of accessory breathing muscles decreased, dyspnea subsided, coughing became more effective, and sputum production was reduced. Consequently, the nursing outcomes of improved breathing patterns and improved airway clearance were achieved in accordance with the established outcome criteria.

The improvement in Mr. I's condition is closely related to the implementation of appropriate and continuous nursing interventions. In COPD patients, ineffective breathing patterns and ineffective airway clearance frequently occur due to airflow limitation, increased secretion production, and decreased lung elasticity. Therefore, the primary focus of nursing care is to maintain airway patency and enhance ventilation effectiveness.

The administration of the semi-Fowler position has been proven to help increase lung expansion and reduce the work of accessory breathing muscles, thereby making the patient's respiratory rate and depth more adequate. Furthermore, breathing exercises such as deep breathing and effective coughing techniques play a vital role in assisting secret mobilization, resulting in an improvement in airway clearance.

Regular respiratory monitoring—including respiratory rate, breath sounds, and oxygen saturation—enables nurses to evaluate the patient's response to the interventions provided. Collaboration in administering oxygen therapy, bronchodilators, and expectorants also supports the success of nursing care by helping to improve ventilation and reduce airway obstruction.

The results of this study are consistent with nursing theory and previous research findings, which state that structured and comprehensive nursing interventions can improve respiratory function and the quality of life for COPD patients. Thus, nursing care plays a vital role in the management of COPD patients with impaired breathing patterns and airway clearance.

### Assessment

A nursing assessment was conducted on Mr. Ishikawa, a patient with a medical diagnosis of Chronic Obstructive Pulmonary Disease (COPD) who was admitted to Okinawa Wellness Hospital, Japan, on February 15, 2025. The patient was born on December 1, 1973, and was 52 years old at

the time of the assessment. The patient is from Itoman, Okinawa, Japan, and has been receiving treatment at Okinawa Wellness Hospital for approximately 5 years.

The patient's primary complaint at the time of the assessment was a decreased level of consciousness. Based on his current medical history, the patient complained of shortness of breath, especially during light activity, accompanied by a cough with thick white phlegm that occurs more frequently in the morning. The patient complained of early fatigue and experienced decreased nutritional intake due to feeding through an NGT (Nasogastric Tube), leading to continuous weight loss during his treatment. Dyspnea was felt to be worsening at night and during cold weather.

The patient's past medical history indicates a history of heavy smoking for 15–20 years (packs per day). The patient ceased smoking after being treated at Wellness Okinawa Hospital due to his worsening shortness of breath. The patient has no history of pulmonary tuberculosis, and there is no family history of similar conditions.

Upon general examination, the patient appeared weak, severely underweight (ca-chexia), with dry skin, low energy, and required assistance with daily activities. The patient's level of consciousness during the assessment was *compos mentis* (GCS 15). Vital signs showed a blood pressure of 130/70 mmHg, a heart rate of 76 beats per minute, a respiratory rate of 28 breaths per minute, a body temperature of 36.7°C, and an oxygen saturation (SpO<sub>2</sub>) of 94%. The patient stated that they were not experiencing any pain. Functional status based on the Barthel Index showed a score of 0, indicating severe dependence in activities of daily living (ADL).

Physical examination of the head and neck showed general conditions within normal limits. The head appeared clean with white, graying hair that was evenly distributed. Eye examination revealed white sclera, pink conjunctiva, clear cornea, isochoric pupils, and good light reflexes. Nasal examination showed nasal flaring during respiration, a midline nasal septum, clean nostrils, and the application of a nasal cannula with an oxygen flow of 4 liters/minute. Oral cavity examination revealed dry lips and mucosa, a pink tongue, and a midline uvula. Ear examination showed symmetrical auricles, clean ear canals, and good hearing. Based on the results of the assessment, the main nursing problems found in the patient were ineffective breathing patterns and ineffective airway clearance related to the COPD condition experienced by the patient.

### **Nursing Diagnosis**

Based on the nursing assessment conducted, two primary nursing diagnoses were identified in patients with Chronic Obstructive Pulmonary Disease (COPD). The first nursing diagnosis is 'Ineffective Breathing Pattern' related to decreased energy, characterized by dyspnea, increased respiratory rate (RR 28 breaths/minute), and the use of accessory breathing muscles. This condition indicates a disturbance in the respiratory mechanism, resulting in the patient's inability to maintain an adequate breathing pattern.

The second nursing diagnosis is 'Ineffective Airway Clearance' related to airway hypersecretion, characterized by an ineffective cough, production of thick white sputum, presence of adventitious breath sounds (rhonchi), and dyspnea. This condition indicates the patient's inability to optimally clear secretions from the airway, which potentially exacerbates the respiratory impairment. These two nursing diagnoses are the top priorities in the planning and implementation of nursing care, as they are directly related to meeting the patient's oxygenation needs.

## **Nursing Interventions**

Nursing interventions were developed based on the established nursing diagnoses, with the goal of improving respiratory function and maintaining the patient's airway clearance.

### **1. Interventions for Ineffective Breathing Pattern.**

Nursing interventions for the diagnosis of Ineffective Breathing Pattern focused on efforts to improve ventilation and reduce the patient's work of breathing. The nursing actions performed included monitoring the frequency, rhythm, and depth of breath, as well as observing the use of accessory breathing muscles. The patient was placed in a semi-Fowler or high-Fowler position to facilitate lung expansion and alleviate dyspnea. Fowler position to maximize lung expansion and ease the breathing process. In addition, nurses provided education and guidance on the pursed-lip breathing technique to help control breathing and reduce dyspnea. Nurses also monitored oxygen saturation and collaborated in the administration of oxygen and pharmacological therapies as medically indicated, such as bronchodilators and mucolytics.

### **2. Interventions for Ineffective Airway Clearance**

Nursing interventions for the diagnosis of Ineffective Airway Clearance aim to assist the patient in clearing secretions and maintaining airway patency. The actions performed include monitoring sputum characteristics (amount, color, and consistency) and auscultating breath sounds to detect any adventitious lung sounds.

## **Nursing Implementation**

Nursing implementation was carried out according to the nursing care plan developed based on the nursing diagnoses of the COPD patient. The nursing actions were performed gradually and continuously over 3 × 24 hours of care. For the diagnosis of 'Ineffective Breathing Pattern', nurses conducted follow-up assessments by monitoring the frequency, rhythm, depth, and effort of the patient's breathing, as well as observing the use of accessory muscles. The patient was placed in a semi-Fowler position to improve lung expansion and facilitate the breathing process. Nurses also monitored oxygen saturation periodically and ensured the administration of oxygen via nasal cannula according to the therapeutic program. Additionally, nurses provided education and guidance on the pursed-lip breathing technique and assisted the patient during breathing exercises to reduce dyspnea. on the diagnosis of Ineffective Airway Clearance, the nurse performed airway management, which included monitoring sputum characteristics, auscultating breath sounds, and assisting the patient with effective coughing techniques and chest physiotherapy. monitored sputum characteristics, including amount, color, and consistency, and performed lung auscultation to detect the presence of rhonchi. The nurse provided effective coughing exercises and assisted the patient in expelling secretions. If secretions were difficult to expectorate, the nurse performed suctioning according to indications and standard procedures. Additionally, the patient was encouraged to increase fluid intake, provided there were no contraindications, to help thin the secretions.

## **Evaluation**

Nursing evaluation was conducted following 3 × 24 hours of nursing care for the COPD patient. The evaluation results showed an improvement in the patient's respiratory condition. For the diagnosis of 'Ineffective Breathing Pattern', the results indicated that the patient's respiratory rate became more regular, the use of accessory breathing muscles decreased, and complaints of dyspnea were reduced compared to the initial condition. The patient was able to follow and perform pursed-lip breathing exercises more effectively. The patient's oxygen saturation remained

within the normal and stable range according to the established target, indicating that the patient's breathing pattern has improved.

For the diagnosis of 'Ineffective Airway Clearance', the evaluation showed that spu-tum production decreased, secretions became easier to expel, and adventitious breath sounds such as rhonchi diminished. The patient demonstrated an improved ability to perform effective coughing, and no signs of respiratory distress were observed during the evaluation. Overall, the evaluation results indicated that the nursing care goals were largely achieved, as evidenced by the improvement in both the patient's breathing pattern and air-way clearance. Consequently, nursing interventions can be continued and adjusted to the patient's current condition to maintain and further enhance their respiratory status.

## CONCLUSION

Based on the case study results of the implementation of nursing care for Chronic Obstructive Pulmonary Disease (COPD) patients with ineffective breathing patterns and in-effective airway clearance at Wellness Okinawa Hospital, Japan, it can be concluded that the nursing care provided comprehensively, were able to improve the patient's respiratory condition. The application of appropriate nursing interventions, such as respiratory monitoring, positioning, breathing exercises, effective coughing, and collaborative medical therapy, showed results in the form of reduced dyspnea, improved breathing patterns, and enhanced airway clearance. Consequently, the nurse's role is vital in improving the respiratory function and quality of life for COPD patients through the implementation of systematic and continuous nursing care.

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