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Implementation of Chest Physiotherapy in Patients with Chronic Obstructive Pulmonary Disease at Dr. H. Koesnadi Hospital

Maulida Al-Qowiyyu Ratu Cahya Intan[1], Hamidah Retno Wardani[2*], Miratul Hasanah[3],
[1] *Diploma Nursing Study Program, University of Bondowoso, Bondowoso, Indonesia*
[2, 3] *Bachelor of Medicine Program, Faculty of Medicine, University of Jember, Jember, Indonesia*
**Corresponding Author*: 199301112025062005@mail.unej.ac.id

Abstract
Background: Chronic obstructive pulmonary disease (COPD) is a lung disorder that will cause ventilation abnormalities in the form of respiratory tract obstruction that is progressive and not fully reversible. This obstruction is related to the lung's abnormal inflammatory response to foreign particles or harmful gases.
Methode: The research design used is a case study with in-depth implementation with the provision of chest physiotherapy in Mr. R and Mr. R. R and Mr. B who experienced COPD with a nursing diagnosis of ineffective airway clearance.
Results: The results of the study after implementation were obtained in client 1. The implementation of the first day of tightness and coughing was slightly reduced and SPO2 rose, then in the second implementation tightness was much reduced coughing phlegm was reduced and SPO2 rose, then in the third implementation tightness was reduced and no longer used O2. In client 2 in the first implementation was still short of breath and coughing up phlegm, then in the second implementation shortness and coughing decreased, then the third implementation shortness and coughing decreased. In conclusion, there were differences in results between client 1 and client 2. client 1 and client 2 after the implementation of chest physiotherapy nursing, but in general this implementation succeeded in raising oxygen saturation and reducing shortness and reducing phlegm stones.
Conclussion: Suggestions for further researchers to apply the Standard Operating Procedure (SOP) of chest physiotherapy in the future related to the nursing problem of ineffective airway clearance in COPD patients.

Keywords: Chronic Obstructive Pulmonary Disease (COPD); Chest Physiotherapy; Ineffective Airway Clearance

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Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a lung disorder that causes ventilation abnormalities in the form of progressive and irreversible airway obstruction. This obstruction is associated with an abnormal inflammatory response of the lungs to foreign particles or harmful gases. In COPD, chronic bronchitis and emphysema are often found together, although they have different processes. This airway obstruction

can cause ineffective airway clearance nursing problems (Nury, 2020). The World Health Organization (2019) states that COPD is the third leading cause of death worldwide. In the latest 2019 report, COPD caused 3.23 million deaths worldwide, and >90% of COPD-related deaths occurred in low- and middle-income countries.

People over the age of 75 have a higher risk of developing COPD. Those who have multiple clinical conditions at the same time may develop this disease more quickly (Indonesian Ministry of Health, 2018). The 2018 Basic Health Research found that the prevalence of Chronic Obstructive Pulmonary Disease (COPD) in Indonesia was higher in men (4.2%) than in women (3.3%), and the prevalence in East Java was 3.6% (Rikesdas, 2018). Data from the Bondowoso Health Office shows that the highest number of COPD patients is in Kademangan with a total of 222 people, followed by Tegalampel with a total of 106 people, and Cermee with a total of 78 people (Bondowoso District Health Office, 2023).

COPD can cause both medical and nursing problems. In nursing, COPD can cause problems such as ineffective airway clearance, activity intolerance, and sleep pattern disturbances. The most common nursing problem in COPD is ineffective airway clearance. Ineffective airway clearance is the inability of secretions or obstructions in the airway to maintain airway clearance (Rahmawati, 2017). Ineffective airway clearance is also defined as the inability to clear secretions or obstructions from the airways to maintain airway patency (SDKI DPP PPNI Working Group Team, 2018).

There are many ways to remove sputum, one of which is through chest physiotherapy. Chest physiotherapy is a method of postural drainage, positioning, percussion, and chest vibration that is used to increase the client's efforts and improve lung function (Tahir et al., 2019). Based on the results of a preliminary study by Wijaya et al. (2019), entitled “The Application of Chest Physiotherapy on Ineffective Airway Clearance at the Musuk Community Health Center, Musuk District, Boyolali Regency,” the results showed a difference in airway clearance after chest physiotherapy, characterized by the absence of additional breathing sounds (ronchi) and a normal breathing rate (16-25 breaths per minute).

Based on the results of a preliminary study by Munikah (2019), entitled Application of Chest Physiotherapy to Overcome Airway Clearance Problems, the results showed that after nursing interventions were carried out during 3 visits, phlegm

could be easily removed. In line with Nurhayati's (2021) research, entitled "The Application of Chest Physiotherapy in Overcoming Ineffective Airway Clearance in Children," it was shown that after chest physiotherapy was performed to overcome airway clearance, additional sounds decreased, respiratory rate decreased, chest wall retraction disappeared, additional breath sounds decreased, SPO2 increased, and body temperature decreased.

Methode

This research used a case study method conducted at Dr. Koesnadi Bondowoso Hospital. Data were collected through interviews, observations, physical examinations, and documentation studies. The research subject was a patient with a medical diagnosis of COPD who experienced ineffective airway clearance. Interventions provided in the form of ineffective airway clearance management through the implementation of chest physiotherapy.

Results

Identitas	
Code	1
Age	79 years
Medical Diagnosis	Observation of Dyspnea + COPD
Keluhan utama	Shortness of breath
History of current illness	The client has complained of shortness of breath since June 2023, with the shortness of breath coming and going and worsening since April 2024. The client also reported a cough with phlegm since December 2023, with thick white phlegm, and the cough also coming and going and worsening since April 2024. When the shortness of breath and cough recurred, the client never sought medical attention, only resting at home and taking time off work. On July 4, 2024, the shortness of breath and cough worsened, so the client visited the general clinic at the Cermee Community Health Center and received Ventolin 1 respul nebulizer therapy. The client was then referred to the Emergency Room at Dr. H. Koesnadi Bondowoso General Hospital, where the following vital signs were recorded: Blood Pressure: 13/87 mmHg, Temperature: 36°C, Pulse: 106 beats per minute, Respiration

	Rate: 49 breaths per minute, SPO2: 93% with 4 liters of oxygen per minute via nasal cannula. In the emergency room, the client received infusion therapy of 14 drops per minute of NaCl, an injection of 1 gram of Anbacim, a drip of 2 ampoules of Aminophylline in 14 drops per minute of NaCl, an injection of 1 gram of Santagesik, an injection of 40 mg of Omeprazole, 4 liters per minute of nasal O2, Ventolin nebulization + 2 cc of NaCl, as well as a complete blood count, swab, EKG, and chest X-ray. The client was admitted to the inpatient ward at 15:54 WIB. During the assessment, the client complained of shortness of breath and coughing up thick white phlegm. In the inpatient ward, a rapid molecular test and phlegm culture were performed. The results of the vital signs examination were as follows: Blood pressure: 126/85 mmHg, Temperature: 36oC, Pulse: 92 beats per minute, Respiration Rate: 28 breaths per minute, SPO2: 96% with 4 liters of oxygen per minute administered via nasal cannula. The client also complained of pain in the pit of the stomach due to frequent coughing, a stabbing pain, pain level 5, pain felt every time he coughed.
Past medical history	The client reported experiencing shortness of breath since June 2023 and coughing up phlegm since December 2024. The client also reported a history of smoking since the age of 20 and began quitting smoking in April 2024.
Family history of disease	The client told the family that they had no history of hereditary diseases.
Nursing Diagnosis	Ineffective airway clearance (D.0001)
Intervention	Chest physiotherapy (I.01004)
Implementation	1. Explain the objectives and procedures of chest physiotherapy 2. Identify indications for chest physiotherapy (e.g., hypersecretion of sputum, thick and retained sputum, prolonged bed rest) 3. Identifying contraindications for chest physiotherapy (e.g., acute exacerbation of COPD, pneumonia without excessive sputum production, lung cancer) 4. Monitoring respiratory status (e.g., rate, rhythm, breath sounds, and depth

	of breathing) 5. Examine lung segments containing excessive secretions 6. Position the patient according to the area of the lung experiencing sputum accumulation 7. Use pillows to help with positioning 8. Encourage slow and deep inspiration through the nose during chest physiotherapy 9. Perform percussion with the palms of the hands cupped for 3–5 minutes 10. Performing vibration with the palms of the hands flat during exhalation through the mouth 11. Recommending coughing immediately after the procedure is complete 12. Monitoring the amount and characteristics of sputum 13. Monitoring tolerance during and after the procedure
Evaluation	S: The client reports decreased shortness of breath and states that they have learned not to use oxygen since yesterday afternoon, feels relieved after expectorating phlegm, and feels more comfortable than before. O: - General condition: Fair - The client is cooperative during chest physiotherapy. - Sputum ± 5 ml, thick white in color. - Additional rales are still heard in the right and left lungs. - Vital signs after chest physiotherapy: - Blood Pressure: 130/80 mmHg - Temperature: 36°C - Pulse: 93 beats per minute - Respiration Rate: 21 breaths per minute - SPO2: 99% without O2 Problem partially resolved (August 25, 2024). Intervention discontinued.

Identitas	
Code	2
Age	70 years
Medical Diagnosis	Observation of Dyspnea + COPD
Main complaint	Shortness of breath
History of current illness	The client has been complaining of shortness of breath since 3 days ago, coughing up

	phlegm, decreased appetite, fever since Sunday with fluctuating temperatures. The client only consulted a midwife and rested at home. On July 5, the shortness of breath and coughing worsened, and the client was taken to the Emergency Room at Dr. H. Koesnadi Bondowoso Regional General Hospital at 10:00 p.m. Vital signs were as follows: Blood Pressure: 136/91 mmHg, Pulse: 103 beats per minute, Temperature: 36°C, Respiratory Rate: 30 breaths per minute, SPO2: 94% without oxygen. In the emergency room, the client received intravenous therapy with 14 drops per minute of NaCl, 2 ampoules of Aminophylline in 14 drops per minute of NaCl, D40% + 2 units of Apidra, 1 ampoule of Ca Gluconate injection, 1 gram of Ambacim injection, 40 mg of Omeprazole injection, Santagesik injection 1 gram, and a complete blood count, antigen swab, and EKG were also performed. The patient was admitted to the inpatient ward at 00:15 WIB. During the assessment, the patient complained of shortness of breath and coughing up phlegm, the phlegm was thick and white, appetite decreased, the patient only ate 1 spoonful of porridge from the hospital due to pain when swallowing. Vital signs were recorded as follows: Blood Pressure: 128/81 mmHg, Temperature: 36°C, Pulse: 90 beats per minute, Respiratory Rate: 27 breaths per minute, SPO2: 98% with 3 liters per minute of nasal oxygen. In the inpatient ward, a sample was taken for TCM examination and sputum culture.
Past medical history	The client said he had a history of COPD since 2022. This was the third time the client had been admitted and treated in hospital with the same diagnosis of COPD. The client also had a history of smoking since he was young and only stopped when he was sick.
Family history of disease	The client told the family that there was no history of hereditary diseases.
Nursing Diagnosis	Bersihan jalan napas tidak efektif (D.0001)
Intervention	Chest physiotherapy (I.01004)
Implementation	1. Explain the objectives and procedures of chest physiotherapy 2. Identify indications for chest physiotherapy (e.g., hypersecretion of sputum, thick and retained sputum, prolonged bed rest) 3. Identify contraindications for chest

	physiotherapy (e.g., acute exacerbation of COPD, pneumonia without excessive sputum production, lung cancer) 4. Monitor respiratory status (e.g., rate, rhythm, breath sounds, and depth of breathing) 5. Examine lung segments containing excessive secretions 6. Positioning the patient according to the area of the lung experiencing sputum accumulation 7. Using pillows to help with positioning 8. Encouraging slow and deep inspiration through the nose during chest physiotherapy 9. Performing percussion with the palms of the hands cupped for 3–5 minutes 10. Performing vibration with the palms of the hands flat during exhalation through the mouth 11. Recommending coughing immediately after the procedure is completed 12. Monitoring the amount and characteristics of sputum 13. Monitoring tolerance during and after the procedure
Evaluation	S: The client reports reduced shortness of breath, feels relieved after expectorating phlegm, and feels more comfortable than before. O: - - General condition: Weak. - The client is cooperative during chest physiotherapy. - Sputum ± 10 ml, thick white in color. - Rapid breathing, rales and wheezing still audible in the right and left lungs. - Vital signs after chest physiotherapy: Blood pressure: 125/85 mmHg, Temperature: 36°C, Pulse: 97 beats per minute, Respiratory rate: 25 breaths per minute - SPO2: 98% with 3 liters per minute of nasal oxygen

Discussion

In this case, the author will discuss the clients and refer to the theory with the structure of Facts, Theory, Opinion. In the discussion of the Implementation of Chest Physiotherapy Nursing on client 1 and client 2 who have Chronic Obstructive

Pulmonary Disease (COPD) with the nursing problem of ineffective airway clearance at the Dr. H. Koesnadi Bondowoso Regional General Hospital in 2024. The discussion on the implementation of chest physiotherapy for Client 1 and Client 2 includes assessment, implementation of therapy, and evaluation.

Assessment

The assessment conducted on client 1 and client 2 suffering from COPD revealed signs and symptoms of ineffective airway clearance in the form of dyspnea (shortness of breath), cough with phlegm, tachycardia, and tachypnea. This is in line with Frisky's (2020) research, which states that COPD is characterized by persistent respiratory symptoms and airflow limitation caused by airway and/or alveolar abnormalities, usually due to significant exposure to harmful particles or gases. Furthermore, this fact is also in line with the results of a study by Setijaningsih (2019), which explains that the symptoms in patients with COPD are shortness of breath and coughing up phlegm. Excessive sputum production causes the cilia clearance process to not run smoothly, resulting in phlegm buildup and ineffective airway clearance. If this is not addressed immediately, the patient will experience airway narrowing and obstruction or blockage of the airway.

Data also shows that both clients, Client 1 and Client 2, have a history of smoking since a young age. This is in line with the results of Sepdianto's (2021) research, which found that the main cause of COPD is exposure to cigarette smoke, both from active and passive smokers. Each cigarette contains thousands of chemicals that cause tissue damage and lung damage. The effects of tobacco content are to stimulate inflammation or sputum production, causing blockages in the airways. This is also in line with the results of Turbaga's (2020) research, which explains that the contents of cigarettes, such as nicotine, CO (carbon monoxide), and tar, stimulate the central nervous system and sympathetic nervous system, resulting in increased blood pressure and heart rate, and stimulating cancer and various other diseases, one of which is COPD.

The researchers' opinion is that clients 1 and 2 experienced ineffective airway clearance symptoms due to the disease process they were experiencing, namely COPD, where COPD causes changes in the respiratory physiology of the client, resulting in

symptoms such as dyspnea (shortness of breath), productive cough, tachycardia, tachypnea, and the presence of rales and wheezing sounds in the client's lungs.

Implementation

On the first day of implementation, client 1 and client 2 said that they had never undergone chest physiotherapy before. Before the therapy, the SPO2 results for client 1 was 97% and for client 2 was 97%. Chest physiotherapy was then performed using percussion and vibration techniques. After chest physiotherapy, the researcher measured the clients' SPO2 and found that Client 1 had 98% and Client 2 had 98%, but both were still using 3 liters of nasal O2 per minute. Both clients were cooperative during chest physiotherapy and appeared comfortable, especially when secretions were maximally expelled after chest physiotherapy.

This is in line with the results of Amelia's (2021) study, which states that the management of COPD is done medicamentously using bronchodilator drugs and non-medicamentously with chest physiotherapy. Chest physiotherapy is one of the physiotherapy programs that is beneficial for several acute and chronic respiratory cases. In COPD, it can help improve the healing process effectively and efficiently. Chest physiotherapy can help reduce secretions in the respiratory tract, improve respiratory function, and prevent lung collapse. Researchers believe that chest physiotherapy affects shortness of breath, coughing with phlegm, and ease of secretion removal, thereby increasing oxygen saturation.

On the second day of implementation, before chest physiotherapy was performed, Client 1 and Client 2 reported still experiencing shortness of breath and coughing. Client 1's SPO2 was 98% with 3 liters of oxygen per minute via nasal cannula, while Client 2's SPO2 was also 98% with 3 liters of oxygen per minute via nasal cannula. The researcher then performed chest physiotherapy as had been done on the first day. After the chest physiotherapy session, the researcher remeasured the clients' SPO2 levels. Client 1's SPO2 remained at 98% but without oxygen supplementation, while Client 2's SPO2 was 98% with 3 liters per minute of nasal oxygen. The clients reported feeling relieved and more comfortable than before, as secretions had been expelled, resulting in reduced shortness of breath.

This is in line with the results of Rohman's (2019) study, which found that chest physiotherapy, effective coughing, and nebulizers had an effect on increasing oxygen

saturation before and after intervention. Chest physiotherapy is closely related to the provision of postural drainage combined with other additional techniques that are considered to improve airway clearance. These techniques include manual percussion and vibration. Postural drainage combined with forceful exhalation has been shown to be beneficial during chest physiotherapy, demonstrating significant improvement in respiratory muscle performance and reduction in O2 desaturation when used in combination. The researcher's opinion is that this therapy can increase oxygen saturation because it facilitates the removal of secretions, thereby reducing shortness of breath.

On the third day of implementation, before chest physiotherapy was performed, Client 1 and Client 2 reported that their shortness of breath and coughing had decreased. Client 1's SPO2 was measured at 98% without O2, and Client 2's SPO2 was measured at 98% with 3 liters per minute of nasal O2. The researcher then performed chest physiotherapy as had been done on the first and second days. After chest physiotherapy, SPO2 measurements were taken again, and the results were 99% without oxygen for Client 1 and 99% with 3 liters per minute of nasal oxygen for Client 2. The clients also stated that they felt more comfortable than before and were grateful that there was less secretion than the previous day.

This is in line with the results of Rachma's (2024) study, which found that the main nursing interventions provided were non-pharmacological, namely effective coughing and chest physiotherapy to facilitate the removal of phlegm. The findings of changes occurring before and after therapy allow one to conclude that chest physiotherapy and coughing are highly effective treatments for patients with Chronic Obstructive Pulmonary Disease (COPD) who have difficulty clearing their airways. The researcher's opinion is that the airway clearance experienced by Client 1 and Client 2, who underwent chest physiotherapy and effective coughing, was proven to help increase oxygen saturation, where after application, the oxygen saturation of both clients was within the normal range. This can occur because chest physiotherapy can help remove secretions so that oxygen saturation can increase. Mechanical chest wall percussion helps release secretions. Vibration increases the speed and turbulence of exhaled air to remove secretions. Postural drainage moves accumulated secretions in clients with

respiratory problems, preventing secretion accumulation in unconscious clients or those on mechanical ventilation.

Evaluation

The first evaluation of Client 1 was conducted on July 5, 2024, at 7:30 a.m. Western Indonesian Time. After receiving chest physiotherapy treatment, the client reported that their shortness of breath had slightly decreased, they felt relieved after coughing up phlegm, and they felt more comfortable than before. General condition: fair, the client was cooperative during chest physiotherapy, breathing was rapid, additional rales were still heard in the right and left lungs, sputum ± 10 ml, thick white in color, TTV after chest physiotherapy: BP: 130/80 mmHg, S: 36oC, N: 95 x/minute, RR: 25 x/minute, SPO2: 98% with 3 liters per minute of nasal oxygen. The client's issues have not been resolved based on the goals and outcome criteria: effective coughing improved (4), sputum production decreased (3), restlessness improved (3), respiratory rate improved (3), breathing pattern improved (3).

The first evaluation of Client 2 was conducted on July 7, 2024, at 8:30 a.m. Western Indonesian Time. after the implementation of chest physiotherapy therapy, the evaluation results were as follows: subjective: the client reported still feeling short of breath but felt more relieved after expelling phlegm, felt more comfortable than before, general condition weak, the client was cooperative during chest physiotherapy, rapid breathing, rales and wheezing still audible in the right and left lungs, sputum ± 15 ml, thick white in color, Vital signs after chest physical therapy: BP: 132/84 mmHg, T: 36°C, HR: 95 beats/minute, RR: 26 breaths/minute, SPO2: 98% with 3 liters per minute of nasal oxygen. The client's issues have not been resolved based on the goals and outcome criteria: effective coughing improved (4), sputum production decreased (3), restlessness improved (3), respiratory rate improved (3), and breathing pattern improved (3).

This is in line with the results of Pratiwi's (2019) research, which found that chest physiotherapy is very effective in removing mucus and improving ventilation in patients with impaired lung function. It aims to restore and maintain respiratory muscle function, help clear mucus and bronchi, prevent buildup, and improve lung mucus movement and flow. This is also in line with the results of Lusiawati's (2020) research, which explains that chest physiotherapy in COPD can help improve the healing process

effectively and efficiently. Chest physiotherapy can help remove secretions in the respiratory tract and improve respiratory function as well as prevent lung collapse.

Second evaluation of Client 1 on July 6, 2024, at 07:30 WIB, after being given chest physiotherapy treatment, the evaluation results are as follows: subjective: the client said that the tightness had greatly decreased, felt relieved after coughing up phlegm, felt more comfortable than before. General condition: adequate, the client was cooperative during chest physical therapy, sputum ± 5 ml, thick white in color, rapid breathing, additional rales still audible in the right and left lungs, Vital Signs after chest physical therapy: BP: 125/80 mmHg, T: 36°C, HR: 90 beats/minute, RR: 23 breaths/minute, SPO2: 98% without O2. The issues with Client 1 have been partially resolved based on the objectives and outcome criteria: effective coughing has improved (5), sputum production has decreased (4), restlessness has improved (4), respiratory rate has improved (4), and breathing pattern has improved (3).

Second evaluation of Client 2 on July 8, 2024, at 7:30 a.m. after the implementation of chest physiotherapy therapy, the evaluation results were as follows: subjective: the client reported reduced shortness of breath, feeling relieved after expectorating phlegm, feeling more comfortable than before, generally weak, cooperative during chest physiotherapy, sputum ± 10 ml, thick white in color, rapid breathing, rales and wheezing still audible in the right and left lungs, Vital signs after chest physical therapy: BP: 125/85 mmHg, T: 36°C, HR: 97 beats/minute, RR: 25 breaths/minute, SPO2: 98% with 3 liters per minute of nasal O2. The problems in Client 2 were partially resolved as seen from the objectives and outcome criteria: effective coughing increased (5), sputum production decreased (4), restlessness improved (4), breathing frequency improved (4), breathing pattern improved (3).

This is in line with the results of Miswandi's (2019) research, which explains that the clapping technique is mechanical energy on the chest that is transmitted to the respiratory tract and can be channeled. In addition, the clapping technique is also useful for restoring and maintaining the function of the respiratory muscles and helping to clear secretions from the bronchi to prevent secretion buildup, improve movement and secretion flow. Meanwhile, effective coughing is a coughing technique that emphasizes maximum inspiration starting from expiration, which aims to stimulate the opening of

the collateral system, increase ventilation distribution, increase lung volume, and facilitate airway clearance.

Third evaluation of Client 1 on July 7, 2024, at 07:30 WIB, after being given chest physiotherapy treatment, the evaluation results are as follows: subjective: the client said that the shortness of breath had decreased and said that he had learned not to use oxygen since yesterday afternoon, felt relieved after coughing up phlegm, felt more comfortable than before. The client's general condition was fair, and they were cooperative during chest physiotherapy. Sputum production was approximately 5 ml, white and thick in consistency. Additional rales were still audible in both the right and left lungs. Vital signs after chest physiotherapy: BP: 130/80 mmHg, T: 36°C, HR: 93 beats per minute, RR: 21 breaths per minute, SPO2: 99% without O2. Client's problems 1 are partially resolved based on the objectives and outcome criteria: effective coughing has improved (5), sputum production has decreased (4), restlessness has improved (5), respiratory rate has improved (5), and breathing pattern has improved (4).

Evaluation of Client 2 on July 9, 2024, at 7:30 a.m. Western Indonesian Time, after the implementation of chest physiotherapy chest therapy, the evaluation results are as follows: Subjective: The client reported reduced shortness of breath but was still unable to learn to remove the oxygen, felt relieved after expelling phlegm, felt more comfortable than before, general condition was adequate, the client was cooperative during chest physical therapy, sputum ± 5 ml, white and thick in color, additional rales were still heard in the right and left lungs, Vital Signs after chest physical therapy: BP: 124/79 mmHg, T: 36.8°C, HR: 93 beats/minute, RR: 22 breaths/minute, SpO2: 99% with nasal oxygen at 3 liters per minute. The client's issues were partially resolved based on the objectives and outcome criteria: effective coughing improved (5), sputum production decreased (4), restlessness improved (5), respiratory rate improved (5), and breathing pattern improved (4).

This is in line with the results of Hamdan's (2023) study, which found that chest physiotherapy in COPD patients can make patients breathe more easily, and that the application of chest physiotherapy can also increase oxygen saturation in COPD patients. This finding is also consistent with the results of Novitasari's (2019) study, which explains that the primary nursing interventions provided are non-pharmacological, namely effective coughing and chest physiotherapy, in collaboration

with pharmacological nebulizer therapy administered to thin and facilitate the expulsion of phlegm. The findings of changes observed before and after therapy allow one to conclude that chest physiotherapy and coughing are highly effective treatments for COPD patients experiencing difficulty clearing their airways.

This is in line with the results of Hamdan's (2023) study, which found that chest physiotherapy in COPD patients can make patients breathe more easily, and that the application of chest physiotherapy can also increase oxygen saturation in COPD patients. This finding is also consistent with the results of Novitasari's (2019) study, which explains that the primary nursing interventions provided are non-pharmacological, namely effective coughing and chest physiotherapy, in collaboration with nebulizer pharmacology administered to thin and facilitate the expulsion of phlegm. The findings of changes that occurred before and after therapy allow one to conclude that chest physiotherapy and coughing are very effective treatments for patients with Chronic Obstructive Pulmonary Disease (COPD) who have difficulty clearing their airways.

This study shows that chest physiotherapy has an effect on ineffective airway clearance in Client 1 and Client 2 before and after chest physiotherapy. Before chest physiotherapy, Client 1's SPO2 was 97% with 3 liters of nasal O2 per minute, and after 3 sessions of chest physiotherapy, it became 98% without O2. Meanwhile, for Client 2, before chest physiotherapy, the SPO2 was 97% with 4 liters of nasal O2 per minute, and after three sessions of chest physiotherapy, it increased to 99% with 3 liters of nasal O2 per minute.

Researchers believe that medical treatment for COPD cannot completely cure the disease. To thin mucus, inhalation or nebulizers are used, while supportive and palliative treatments are only used to improve quality of life by meeting oxygen needs. Therefore, researchers intervened with inhalation therapy, supportive care, and palliative care. These interventions include chest physiotherapy, followed by deep breathing and effective coughing exercises for the patient. After the intervention, researchers measured oxygen saturation. Supportive and palliative care are very helpful in meeting oxygen needs, so they play a very important role through chest physiotherapy, including percussion, vibration, postural drainage, effective coughing,

and deep breathing to facilitate the removal of secretions so that the airways become clear and oxygen saturation increases.

Conclusion

Based on the results of the nursing care provided to Client 1 and Client 2 with Chronic Obstructive Pulmonary Disease (COPD), it can be concluded that both clients experienced ineffective airway clearance characterized by symptoms such as dyspnea, productive cough, tachycardia, tachypnea, and the presence of additional breath sounds such as rales and wheezing. These symptoms occurred due to the COPD disease process, which causes airway inflammation, excessive sputum production, and airflow limitation. Both clients also had a history of long-term smoking, which is a major risk factor contributing to lung tissue damage and airway obstruction.

The implementation of chest physiotherapy, including percussion, vibration, postural drainage, and effective coughing exercises, was carried out for three consecutive days. The intervention showed positive outcomes in both clients. There was an improvement in oxygen saturation levels, reduction in sputum production, decreased shortness of breath, and increased patient comfort. Client 1 showed greater progress, as oxygen therapy was no longer required by the end of the intervention, while Client 2 still required oxygen support but demonstrated improvement in respiratory status.

Evaluation results indicated that airway clearance improved in both clients, although the problem was categorized as partially resolved according to the established nursing outcome criteria. The therapy helped facilitate the removal of respiratory secretions, improve ventilation, and increase oxygen saturation levels. Therefore, it can be concluded that chest physiotherapy is an effective non-pharmacological nursing intervention to help improve ineffective airway clearance in COPD patients. This intervention supports the removal of airway secretions, enhances respiratory function, and contributes to improving the patient’s comfort and oxygenation status.

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