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Pulmonary Tuberculosis Nursing Care with Management of Airway Clearance: Case Study

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Abstract: Pulmonary tuberculosis is a contagious infectious disease with the highest prevalence in the world and the third largest in Indonesia with 10.4 million cases each year. Transmission occurs when a sufferer coughs or sneezes and the sufferer accidentally spreads germs into the air in the form of droplets. A person suffering from pulmonary tuberculosis can infect 10-15 people around him. Therefore, infectious disease management needs to be carried out as an effort to control several disease risk factors to maintain and improve public health. Objective: This case study aims to test the effectiveness of implementing effective coughing as a management method for ineffective airway clearance in pulmonary tuberculosis sufferers. Method: The method used is a case study by taking anamnesis, observation, physical examination and medical records. The participant in this study was Mr. R with pulmonary tuberculosis. Results: The results of this case study show that Effective coughing exercises are useful for managing airway clearance in pulmonary tuberculosis sufferers, this is characterized by sputum that can be expelled through the mouth, which is characterized by reduced shortness of breath, normal respiratory frequency, regular breathing rhythm, no additional breath sounds. Therefore, cough training has been empirically proven to be effective in managing airway clearance in pulmonary tuberculosis patients. Recommendation: Effective coughing can only be applied to pulmonary tuberculosis patients with shortness of breath, cough with phlegm, rhonchi breath sounds, and complaints that sputum is difficult to expel.

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Introduction

Pulmonary tuberculosis is characterized by spastic contractions of the smooth muscle of the bronchioles which makes breathing difficult, so that the client feels short of breath. The mycobacterium tuberculosis bacteria will invade the upper respiratory tract, causing inflammation in the bronchi, resulting in a buildup of sputum that is difficult to expel. In people with pulmonary tuberculosis, sputum production will increase over time. The sputum is initially mucoid and then becomes thick, if it hardens and softens, it will trigger problems with ineffective airway clearance (Lestari et al, 2020; Setiawan, 2018) .

Several nursing interventions that can be carried out to expel sputum include active cycle breathing technique (ACBT), chest physiotherapy, post-real drainage, nebulizer therapy, effective coughing, and suctioning. In this case, because the patients, the researchers managed had received nebulizer therapy and chest physiotherapy, the researchers wanted to carry out one intervention that was useful for expelling sputum in pulmonary TB sufferers, namely effective

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coughing exercises. Effective coughing technique is the correct coughing technique by maximally suppressing inspiration followed by exhalation which is repeated three times with the aim of stimulating the opening of the collateral system, increasing ventilation distribution, and increasing lung volume which is then done by coughing vigorously, so that the sputum is in the airway can exit through the mouth (Febriyani et al ., 2021; Sidiq & Sari, 2022).

One major nursing issue that frequently occurs in patients with pulmonary tuberculosis (TB) is ineffective airway clearance. This condition is typified by the person's incapacity to clear the airway of secretions or blockages, which may result in problems with airway patency. To treat this issue, cough control is essential since it keeps the airway patency and helps clear the airway of phlegm. Cough is a defining feature of tuberculosis and is essential to the disease's spread. Cough intensity and frequency are useful indicators of disease progression and therapy response. A study indicated that cough power or frequency of episodes was not as good as total time spent coughing in predicting microbiologic indications of illness severity and responsiveness to treatment (Zimmer et al., 2022; Rahman, 2022)

Apart from administering medication, nurses are essential in efficiently treating cough in tuberculosis patients. This includes methods. The methods are like measuring cough frequency and intensity using equipment, encouraging patients to cough efficiently to clear phlegm from the airway, and keeping an eye out for symptoms of inefficient airway clearance (Zimmer et al., 2022; Rahman, 2022).

It is crucial to optimize airway management in pulmonary tuberculosis nursing care with efficient airway clearance to improve patient outcomes and avoid problems like respiratory collapse. As a result, nurses need to adopt measures to encourage coughing and airway clearance in patients with tuberculosis and understand the significance of appropriate cough management in these patients.

Method

On 8 January 2022, the application of effective cough techniques to the patient has been carried out by elite researchers. The results of the assessment before effective coughing were carried out were that the client was unable to expel sputum with a RR of 29 times /minute and there were wheezing and wheezing breath sounds. The interventions are performed using the books in accordance with the criteria of the Indonesian National Nursing Planning (PPNI). Namely SDKI, SLKI, and SIKI to determine nursing diagnoses, nursing goals and objectives, nursing plans and to evaluate actions given to patients (Tim Pokja SDKI DPP PPNI, 2017; Tim Pokja SLKI DPP PPNI, 2022, Tim Pokja SIKI DPP PPNI, 2018).

However, after carrying out the effective coughing action, it showed positive results where the client was able to expel the sputum that was in the airway through the mouth with a characteristic thick, yellowish-white textured sputum. After carrying out an effective coughing action, the researcher then asked about the response after carrying out this action and the result was that the client felt more relieved when breathing.

Result and Discussion

An infectious condition called pulmonary tuberculosis is brought on by contact with the mycobacterium tuberculosis. These bacteria will enter the upper respiratory system and inflame the bronchi, which will make it difficult for the afflicted individuals to discharge the accumulated sputum and cause shortness of breath. Sputum output rises with time in pulmonary tuberculosis patients. Effective coughing techniques release little amounts of mucous, which transforms to thickness when quenching and softening takes place. The mucus is originally mucoid in composition (Lestari et al., 2020; Rahman, 2022; Richard et al., 2022; Setiadi et al., 2024)..

Sputum buildup results in inflammation. It is crucial to cough up phlegm using efficient procedures since inflammation can lead to infection, which can exacerbate coughing. A Study indicates that clearing the airway of sputum requires an effective cough. The goal of effective coughing is to mobilize secretions, increase lung expansion, and reduce negative effects from secretion retention while allowing the client to conserve energy and cough up the maximum amount of phlegm (Lestari et al., 2020; Rahman, 2022; Richard et al., 2022; Setiadi et al., 2024).

According to another study that supported, coughing effectively helps to clean and loosen the respiratory tract and alleviate dyspnea caused by mucus buildup in the respiratory system. Mucus can originate from respiratory tract infections or from an individual's multiple ailments. It might manifest as phlegm or nasal secretions. The generation of sputum, the patient's health, and the existence of an object obstructing the airway all support removing sputum. A pulmonary tuberculosis patient will not produce much sputum if any one of these three conditions is true. Sputum discharge clears the airway of secretions that have accumulated there, allowing the breathing rhythm and frequency to return to normal and the airway to be deemed patent. This includes methods like measuring cough frequency and intensity using equipment,

encouraging patients to cough efficiently to clear phlegm from the airway, and keeping an eye out for symptoms of inefficient airway clearance (Lestari et al., 2020; Rahman, 2022; Richard et al., 2022; Setiadi et al., 2024).

According to the results of research conducted by Lestari et al. (2020), Suryarinilsih et al. (2023) and Wulandari et al. (2023), coughing can be made more effective by using warm water to soften the phlegm and then using breathing and coughing techniques. This method is taking a big inhale via the nose, retaining it, and slowly releasing it through the mouth with rounded lips. It is then followed by a hard cough. When coughing, deep inspiration and holding of the breath can expand the lung volume, causing a stronger and faster expiration that helps release secretions more easily (Lestari et al., 2020; Suryarinilsih & Budi, 2023; Wulandari et al., 2023).

It emphasizes that improving airway clearance in patients with pulmonary tuberculosis is the main objective of using effective cough strategies (Puspitasari & Khasanah, 2022, Moreira, 2023). Healthcare professionals can maximize sputum evacuation and enhance respiratory function in these individuals by concentrating on coughing techniques and deep breathing exercises.

Conclusion

Regular breathing rhythm, vesicular breath sounds, no rhonchi or wheezing, and the patient can expel sputum independently with this technique. Therefore, effective coughing can be said to have been empirically proven (evidence-based practice) as management of airway clearance in pulmonary tuberculosis patients.

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