Case Report: Management of Ineffective Breathing Patterns in Pulmonary Tuberculosis Patients Using Orthopnea Positioning

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ABSTRACT

Background: *Tuberculosis is a chronic and infectious disease that can cause damage or fibrosis of the airway and lung tissue. The typical signs and symptoms of this disease are shortness of breath and cough. Ineffective breathing pattern is the process of exiting and or entering air that does not provide adequate ventilation characterized by the main problem of shortness of breath which is the main complaint in Tuberculosis.* ***Objective:*** *This case study aims to perform orthopneu position management on clients with Tuberculosis with the nursing problem of ineffective breathing patterns.* ***Methods:*** *This case study researchers used a descriptive observational method with a nursing care process approach starting from the assessment process, diagnosis, intervention and implementation and evaluation for 3 days, Patients totaled 2 people with inclusion criteria: 1. Tuberculosis patients, 2. There are major signs of 80-100% ineffective breathing patterns.* ***Results:*** *After applying the orthopnes position to 2 patients, the evaluation results on day 3 on Mrs. "H" showed that the problem was resolved with supporting data: Dyspnea / tightness (Decreased), Use of respiratory muscles (Decreased), elongated expiratory phase (Decreased), Nasal lobe breathing (Decreased), Breathing frequency (24x / m). While Mrs. "S" day 3 evaluation shows the problem is resolved with supporting data: Dyspnea (Decreased), Use of breathing muscles (Decreased), Expiratory phase lengthening (Decreased), Breathing frequency (22x/m).* ***Conclusion:*** *Nursing care with the Implementation of Orthopnea Positioning in 2 patients can be concluded to be effective in Overcoming Ineffective Breathing Patterns.*

ABSTRAK

Latar Belakang: Tuberkulosis merupakan penyakit kronis dan menular yang dapat menyebabkan kerusakan atau fibrosis pada saluran napas dan jaringan pada paru- paru. Tanda gejala yang khas dari penyakit ini adalah sesak nafas dan batuk. Pola nafas tidak efektif merupakan proses keluar dan atau masuknya udara yang tidak memberikan ventilasi adekuat yang ditandai dengan masalah utama sesak nafas yang merupakan keluhan utama pada *Tuberkulosis*. **Tujuan:** Studi kasus ini bertujuan melakukan penatalaksanaan posisi orthopneu pada klien dengan Tuberculosis dengan masalah keperawatan pola nafas tidak efektif. **Metode:** Studi kasus ini peneliti menggunakan metode observasional deskriptif dengan pendekatan proses asuhan keperawatan mulai dari proses pengkajian, diagnosa, intevensi dan implementasi serta evaluasi selama 3 hari, Pasien berjumlah 2 orang dengan kriteria inklusi: 1. Pasien Tuberculosis, 2. Terdapat tanda mayor 80-100% Pola nafas tidak efektif. **Hasil:** Setelah dilakukan penerapan posisi orthopnes pada 2 Pasien didapatkan hasil evaluasi di hari ke 3 pada Ny."H" menunjukkan Masalah teratasi dengan data penunjang: *Dispnea* / sesak (Menurun), Penggunaan otot bantu pernapafasan (Menurun), fase ekspirasi memanjang (Menurun), Pernapasan cuping hidung (Menurun), Frekuensi napas (24x/m).

Sedangkan Ny.“S” evaluasi hari ke 3 menunjukkan Masalah teratasi dengan data penunjang: *Dispnea* (Menurun), Penggunaan otot bantu napas (Menurun), Pemanjangan fase ekspresi (Menurun), Frekuensi napas (22x/m). **Kesimpulan:** Asuhan keperawatan dengan Implementasi Posisi *Orthopnea* pada 2 pasien dapat disimpulkan efektif Mengatasi Pola Nafas Tidak Efektif.

Kata Kunci
Pola napas tidak efektif, Posisi ortopnea, Tuberkulosis

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1. Introduction

An inspiratory and/or expiratory process that does not provide adequate ventilation is called an ineffective breathing pattern. It is characterized by significant dyspnea, as well as other factors such as decreased vital capacity, decreased expiratory and or inspiratory pressure, and abnormal breathing patterns. (Endrianti, 2021). TB often settles in the lungs (pulmonary TB) but can also affect other organs (extrapulmonary TB). Most people affected by the disease (about 90%) are adults and there are more cases among men than women (WHO, 2023).

According to World Health Organization (WHO) data in 2023, TB cases worldwide increased from 10 million in 2020 to 10.3 million in 2021, and rose again to 10.6 million in 2022 (WHO, 2023). New case finding in 2023 showed a 74% increase from the previous year. At least 86% of drug-sensitive tuberculosis and drug-resistant tuberculosis were cured (MOH RI, 2023). According to the East Java Central Bureau of Statistics, the number of tuberculosis (TB) victims in East Java increased from 53,289 cases in 2021 to 81,753 cases in 2022. data from the East Java Central Bureau of Statistics in Sampang Regency obtained a TB discovery rate of 67.00%, and a TB treatment success rate of 84.00% (East Java Central Bureau of Statistics, 2023). Meanwhile, data on TB patients at Omben Health Center in 2023 totaled 68 patients.

The initial symptom and is the most common disorder complained of by people with pulmonary TB is coughing. At first it is non-productive then gradually becomes a cough with phlegm that is difficult to expel, resulting in shortness of breath. Shortness of breath occurs due to incomplete lung development conditions due to the affected lung part not containing air or collapsing. If there are complications that show extensive damage to the lung parenchyma, clients will usually show shortness of breath, increased respiratory frequency, and the use of breathing apparatus (Amiar and Setiyono, 2020). The buildup of secretions on the walls of the lungs or respiratory tract leads to decreased chest expansion as pulmonary TB disease progresses. This can cause problems in the pulmonary vasculature and lower respiratory tract, causing difficulty breathing or dyspnea, which is the main complaint of ineffective breathing patterns (Hanna et al., 2023).

Disease problems that arise in patients with pulmonary TB are usually more of a respiratory system problem that causes ineffective breathing patterns, ineffective airway clearance, and gas exchange (SDKI, 2018). If oxygen levels in the blood are low, oxygen is unable to penetrate the walls of red blood cells and the amount of oxygen in red blood cells that carry hemoglobin to the left heart and flow to the periphery to the periphery becomes less which causes oxygen supply to be disrupted, blood in the arteries lacks oxygen and there is a decrease in oxygen saturation in the blood (Amiar and Setiyono, 2020). The role of nurses in this case intervenes in patients by observing respiratory frequency, monitoring oxygen saturation, monitoring additional sounds, observing the depth of the patient's breathing, increasing bed rest or limiting activity, adding appropriate oxygen (O2), breathing exercises, and adjusting body position (Syapitri, 2023).

Therapies such as deep breath relaxation and other therapies can help overcome ineffective breathing patterns. To reduce the patient's shortness of breath and improve the airway, orthopnea position therapy is one of the self-care interventions in Ineffective Breathing Patterns. Orthopnea position therapy should be performed routinely in pulmonary tuberculosis patients to reduce shortness of breath (Henny et al., 2023). Previous research shows that Orthopnea Position Therapy reduces shortness of breath in patients with tuberculosis in 50 respondents at Pringadi Medan Hospital. The therapy was given every day once in three repetitions (Hanna eta al., 2023).

This case study aims to perform orthopneu position management on clients with Tuberculosis with the nursing problem of ineffective breathing patterns.

2. Methods

This case study uses a descriptive observational method with a case study design that is carried out with the main objective of describing or making a description of an objective study of the situation (Notoatmodjo, 2018). Researchers use descriptive methods with a nursing process approach consisting of assessment, setting nursing diagnoses, planning, implementation, and evaluation. This study consisted of 2 tuberculosis patients with ineffective breathing patterns. This study was conducted for 3 days in the omben health center work area of Sampang Regency with declared ethical feasibility through number 019/KEP/UNT/DEA/IV/2024. inclusion criteria: 1. Tuberculosis patients, 2. There are major signs of 80-100% ineffective breathing patterns.

3. Results and Discussion

Results

Researchers describe this case report into two parts, namely general information containing the respondent's identity / general data and initial assessment data and case descriptions in the form of evaluation data obtained from the implementation of orthopnea positioning in tuberculosis patients with ineffective breathing pattern nursing problems. The respondent's identity and initial assessment data are presented in the form of a data table as follows.

Respondents	General Data	Assessment Results
P1	Gender : Female Age : 44 Education : SD Tribe : Madura Religion : Islam Marriage Status : Marriage	The patient complains of shortness of breath, there is the use of respiratory muscles, the expiratory phase is elongated, RR 29x / m (tachypnea), there is nasal breathing.
P2	Gender : Female Age : 40 Education : SD Tribe : Madura Religion : Islam Marriage Status : Marriage	The patient complains of shortness of breath, there is use of respiratory muscles, there is nasal lobe breathing, the expiratory phase is elongated, RR 28x / m (tachypnea)

Source: Primary Data, 2024

Based on the table above, it shows that respondents experience nursing diagnoses of Ineffective Breathing Patterns associated with Breathing Effort Obstacles characterized by dyspnea, use of breath support muscles, elongated expiratory phase, abnormal breathing patterns, nasal lobe breathing with the following goals, nursing plans and evaluations:

Nursing Problems	Nursing goals	Nursing Plan	Nursing evaluation
Ineffective Breathing Pattern (P1.P2)	After taking action for 1 day 1x in 30 minutes, for 3 days it is expected that the breathing pattern will improve with the outcome criteria: 1. Dyspnea Decreased 2. Decreased use of auxiliary muscles 3. Prolongation of expiratory phase Decreased 4. Nasal lobe breathing Decreased 5. Respiratory frequency improved (16-24 x/min).	Airway Management Observation: 1. Monitor breathing pattern (frequency, depth, breath effort) 2. Monitor for additional breath sounds (e.g. gurgling, wheezing, wheezing, dry ronkhi) 3. Monitor sputum (amount, color, aroma) Therapeutic: 1. Position the orthonea 2. Give warm drink	S : - Dyspnea (Decreased) O : - Use of breath support muscles (Decreased) - Prolongation of expression phase (Decreased) - Nasal lobe breathing (Decreased) - (P1) Breathing frequency (24x/m), (P2) Breathing frequency (22x/m) A : Problem solved P: Intervention is stopped

Source: Primary Data, 2024

Discussion

Evaluation on day 3 on Mrs. "H" obtained data with the results after therapy: Dyspnea (Decreased), Use of breathing muscles (Decreased), Expression phase lengthening (Decreased), Nasal lobe breathing (Decreased), Breathing frequency (24x/m). While Mrs. "S" after therapy obtained data with the results after therapy Dyspnea (Decreased), Use of breathing muscles (Decreased), Lengthening of the expression phase (Decreased), Breathing frequency (22x / m) Problem Resolved**.**

Setting the right and comfortable position for patients is very important, especially patients who experience shortness of breath, the results of this study indicate that the orthopnea position is more effective for reducing shortness of breath in pulmonary TB patients with an average decrease in shortness of breath. The orthopnea position is more effective for reducing shortness of breath in patients with pulmonary tuberculosis (Zahroh & Susanto, 2017). Orthopnea position training can reduce dyspnea and improve the airway so it is necessary to do orthopnea positioning in pulmonary tuberculosis patients routinely (Septiyani & Cahyono, 2019). According to Wijayati et al. (2019), the semi-fowler 450 sleeping position also affects the increase in oxygen saturation levels.

According to Syaputri, H., et al. 2023 orthopnea position can reduce dyspnea and improve airway so it is necessary to do orthopnea position in pulmonary tuberculosis patients routinely orthopnea position can be used to treat shortness of breath patients because this can reduce heart rate, HR, RR, shortness of breath scale, but not SpO2. The application of orthopnea position for 3 days with a time of 20 minutes obtained the results of the patient saying comfortable and shortness of breath reduced with a respiratory frequency of 20 x/minute, oxygen saturation 96% and breathing patterns become regular. The nursing problem of ineffective breathing patterns is resolved (Dina and Endang, 2024).

According to Ulinnuha, F.K., Sari, I.M. 2024 Patients in the orthopnea position sit on the bed with the body slightly face down on the pillow. This position helps with breathing

problems by providing greater chest expansion and helps with exhalation problems. This position also improves diaphragm function and reduces pressure on the abdominal muscles, providing more space for the lungs to expand and helping pulmonary tuberculosis patients reduce shortness of breath. application of orthopnea position in patient 1 RR value 27x/min to 20x/min. While in patient 2 before the application of the orthopnea position, the RR value was 29x/min to 22x/min. Orthopnea position is one of the non-pharmacological techniques to reduce shortness of breath/dipsnea in pulmonary TB patients (Dian, 2024).

Implementation of Orthopnea Position is Very Effective to Overcome Ineffective Breathing Patterns in Tuberculosis Patients. When the patient follows the procedure according to the SOP, namely the implementation of the 30-minute orthopnea position carried out for 3 consecutive days. After the action was taken, observation of the patient's breathing pattern was found to decrease from the frequency of breathing 29x / m to 24x / m and 28x / m to 22x / m. The average decrease in breath frequency after the implementation of orthopnea position is proven to be effective, namely the implementation of orthopnea position is proven to be effective to overcome ineffective breathing patterns in tuberculosis patients.

The application of orthopnea positioning therapy suggests that it can help maintain good respiratory function. These two patients may have a positive response to orthopnea positioning therapy, which suggests that this technique may be one of the effective interventions to support patients' respiratory health. However, this is supported by the patient's specific condition and other factors such as age, comorbidities, and disease severity. Thus, orthopnea positioning therapy can be considered as one of the safe and potential methods to help patients with respiratory problems, provided that measurement and monitoring are done carefully. However, there are limitations in this case study, including the number of participants being 2, making it less representative of the results of this study.

4. Conclusion

The application of orthopnea position to ineffective breathing patterns in tuberculosis patients in 2 patients can be concluded to be effective in overcoming ineffective breathing patterns.

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