



Case Report

ANALYSIS OF NURSING CARE PLAN FOR PULMONARY TUBERCULOSIS PATIENTS WITH PURSED LIPS BREATHING INTERVENTION AT HOSPITAL WEST JAVA PROVINCE



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Abstract

Pulmonary tuberculosis remains a global health problem, with Indonesia ranking second in the world in terms of TB cases, with West Java recording high cases. Although pharmacological therapy is the mainstay of pulmonary tuberculosis management, non-pharmacological interventions such as pursed lips breathing (PLB) have been shown to improve ventilation, reduce CO₂ retention, and increase oxygen saturation, however, its application in nursing practice is still very limited. This study aims to analyze the application of pursed lips breathing in pulmonary TB patients at Hospital in West Java Province. This study uses a case study approach with the nursing problem of ineffective breathing patterns and the administration of pursed lips breathing in the Umar bin Khattab 3 room. Based on the results of a physical examination obtained by the patient, the respiratory rate was 27 breaths/minute, oxygen saturation was 93%, accessory muscles were used for breathing, there was rales in the left lung, and thick sputum was difficult to expel. Based on the assessment results, three nursing diagnoses were established: ineffective airway clearance related to airway hypersecretion, ineffective breathing pattern related to breathing effort obstruction, and sleep pattern disturbance related to lack of sleep control. Interventions included airway management, effective coughing exercises, sleep support, nebulization, oxygen therapy, and pursed-lip breathing exercises during the three days of treatment. The evaluation results showed significant improvement with oxygen saturation increasing to 97%, respiratory rate decreasing to 20 breaths/minute, reduced sputum, and improved sleep quality. These findings confirm that pursed-lips breathing is an effective non-pharmacological intervention that supports pharmacological therapy in improving respiratory function and quality of life in pulmonary TB patients. Therefore, a holistic nursing approach is recommended for optimal TB care.

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Introduction

Indonesia, as a tropical country, has a high potential for the spread of infectious diseases, especially Pulmonary Tuberculosis (TB), which remains a global health problem. According to the World Health Organization (WHO, 2020), approximately 10 million people worldwide suffer from TB, with a death toll of 1.2 million. Recent data indicates that Indonesia ranks second globally in TB cases, contributing about 10% of the world's total cases (WHO, 2023). This condition confirms that pulmonary TB remains a significant challenge for Indonesia's healthcare system.

At the national level, the incidence of pulmonary TB shows a significant upward trend. TB cases in Indonesia rose from 824,000 in 2020 to 969,000 in 2022, equivalent to one new case every 33 seconds (WHO, 2022). Provinces with high population densities, such as West Java, recorded the highest number of cases, with 233,334 cases in 2023 and increasing to 234,710 cases in 2024 (Kemenkes RI, 2020). These figures indicate a high epidemiological burden and the need for innovation in the management of pulmonary TB patients in these areas.

Pathophysiologically, pulmonary TB is caused by *Mycobacterium tuberculosis* infection transmitted through the air, mainly through coughing and sneezing (Kemenkes RI, 2020; Puspitasari et al., 2023). This disease can cause lung tissue damage, leading to complications such as hemoptysis, lung collapse, fibrosis, and even death (Soedarsono & Astuti, 2020). Additionally, pulmonary TB patients often experience severe respiratory distress such as shortness of breath and decreased oxygen saturation, which results in a reduced quality of life (Fradisa et al., 2022; Santi, 2024).

Although pharmacological therapy remains the mainstay of TB management, non-pharmacological interventions such as pursed lips breathing (PLB) also play an important role in reducing shortness of breath symptoms. Various studies have shown that PLB can improve ventilation, reduce carbon dioxide (CO₂) retention, and increase oxygen saturation (Islamayshaka et al., 2024; Rumilang, 2024; Siokona et al., 2023; Suparda et al., 2020).

However, preliminary study results at Welas Asih Regional General Hospital in West Java Province (November 22, 2025) indicate that the application of PLB techniques remains very limited. Based on interviews with the head of the Umar bin Khattab 3 ward, pulmonary TB patients generally only receive oxygen therapy and nebulization without PLB education. Patients are often unaware of this technique and may experience symptom recurrence due to reliance primarily on pharmacological therapy. This fact indicates a gap in the implementation of non-pharmacological interventions in nursing services.

Therefore, this study aims to analyze the application of pursed lips breathing technique in patients with pulmonary tuberculosis at Welas Asih Regional General Hospital, West Java Province. It is hoped that through this intervention, patients can improve their breathing ability, reduce shortness of breath, increase oxygen saturation, and improve their quality of life during treatment. The hypothesis of this study is that the application of PLB can have a positive effect on the respiratory function of pulmonary tuberculosis patients

Presentation of the Case

a. Patient Information

The patient in this study was a 75-year-old man who worked as a day laborer. The patient resided in the Cirebon Regency and was treated in the Umar bin Khattab 3 ward of Welas Asih Regional General Hospital in West Java Province. The patient's main complaint was shortness of breath, which had worsened over the past two days, especially when performing light activities, accompanied by a yellowish cough and difficulty sleeping due to shortness of breath. His current medical history indicated that he experienced continuous shortness of breath, which decreased at rest but increased during activities, with a respiratory rate of 27 breaths per minute. The patient also mentioned that the shortness of breath felt like pressure on the chest. Past medical history revealed that the patient had been hospitalized with similar complaints and had a history of pulmonary tuberculosis since 2021 and is an active smoker. Family history revealed no hereditary or infectious diseases such as

hypertension, diabetes mellitus, HIV, or tuberculosis.

b. Clinical Findings

Physical examination results showed that the patient was compos mentis with a GCS of 15, blood pressure of 140/76 mmHg, pulse of 83 beats per minute, respiration rate of 27 breaths per minute, body temperature of 36.6°C, and oxygen saturation of 93%. In the respiratory system, accessory breathing muscles were observed, a 3-L/min nasal cannula was attached, auscultation revealed rales in the left lung, percussion produced a dull sound, and chest expansion was symmetrical. The cardiovascular system showed a pale face, regular heart sounds without abnormalities, CRT < 2 seconds, and normal heart borders. In the digestive system, the abdomen appeared normal, with no bloating or tenderness, bowel sounds were heard at 10 times/minute, and tympanic percussion. The patient's central nervous system function was within normal limits, with good orientation to person and places.

c. Timeline

This assessment was conducted over three days, from November 22, 2024, to November 24, 2024 in the Umar Bin Khattab 3 room at Welas Asih Regional General Hospital, West Java Province.

d. Diagnostic Assessment

The nursing diagnoses identified for this patient included three main problems, namely ineffective airway clearance associated with hypersecretion of the airways, indicated by the presence of sputum (D.0001), ineffective breathing pattern associated with breathing difficulties, characterized by a respiratory rate of 27 breaths per minute (D.0005), and sleep pattern disturbance associated with lack of sleep control, characterized by only five hours of sleep per night and 30 minutes of sleep per day (D.0053). These problems arose as a result of the patient's respiratory condition, which causes physiological and psychological effects.

e. Therapeutic Interventions

Based on the previous diagnosis, pursed lips breathing (PLB) was chosen as the main intervention because it has been proven

effective in improving breathing patterns by increasing positive pressure in the airway during exhalation, thereby keeping the airway open and optimizing gas exchange. The outcomes of the intervention included normalization of respiratory rate (12–20 breaths/minute), increased oxygen saturation to 95–100%, reduced use of accessory breathing muscles, and decreased dyspnea levels. Unlike other interventions, PLB offers the advantage of sustainability as a cost-free and equipment-independent technique that patients can perform independently, making it ideal for long-term self-management. After pursed lips breathing (PLB) is performed, it is followed by effective coughing exercises to facilitate mechanical clearance of secretions, optimized by improved breathing patterns, creating a synergistic effect in which better ventilation allows for more effective mucus expectoration. Finally, sleep support interventions were provided to address secondary effects, enabling patients to achieve 7–8 hours of quality sleep per night as dyspnea is naturally resolved through successful PLB practice. This hierarchical approach ensures that PLB addresses fundamental respiratory dysfunction first, followed by complementary airway clearance, and finally sleep improvement as a natural consequence of respiratory recovery.

f. Follow-up and Outcomes

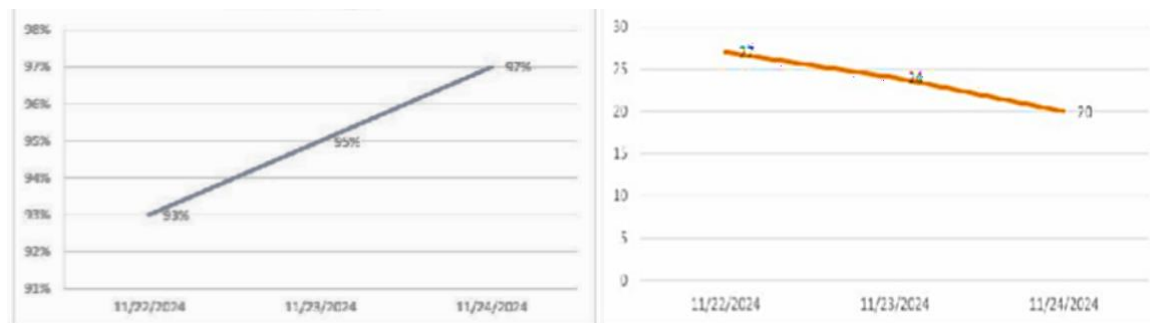
Based on the results of nursing care provided to a 75-year-old patient diagnosed with pulmonary tuberculosis, various interventions were carried out, such as airway management, effective coughing exercises, sleep support, nebulization, oxygen therapy, and pursed-lip breathing (PLB) exercises. During the three days of treatment (November 22–24, 2024), the patient's condition showed significant improvement. At the beginning of treatment, the patient experienced shortness of breath with a respiratory rate of 27 breaths/minute, oxygen saturation of 93%, and thick sputum that was difficult to expel. After regular interventions, the sputum decreased, the patient was able to cough more effectively, the respiratory rate decreased to 20 breaths per minute, oxygen saturation increased to 97%, and sleep quality improved. The

progress of the patient's respiratory status can be clearly observed in the following graphs.

comfort, and quality of life, with no adverse events during treatment.

Figure 1

Oxygen Saturation and Respiration Rate



The first graph shows a consistent increase in oxygen saturation from 93% on November 22, 2024, to 95% on November 23, 2024, and reaching 97% on November 24, 2024. Meanwhile, the second graph demonstrates a gradual decrease in respiratory rate from 27 breaths per minute at the beginning of treatment to 24 breaths per minute on the second day, and further declining to 20 breaths per minute on the third day. These objective data confirm the effectiveness of the implemented nursing interventions in improving the patient's respiratory function. The evaluation results showed that the patient was cooperative with the therapy, no adverse effects were identified, and all interventions were well tolerated.

These findings are in line with research evidence showing that PLB is effective in increasing oxygen saturation, decreasing respiratory rate, and reducing dyspnea in patients with chronic lung disease (Amiar & Setiyono, 2020; Santi, 2024; Shafiq et al., 2022). The combination of non-pharmacological interventions (PLB) with pharmacological interventions such as Flutison and Ventolin nebulization, as well as oxygen therapy, has been shown to accelerate patients' respiratory recovery. Nebulization helps thin secretions and moisturize the airways (Yan, 2025), while oxygen therapy is recommended by the WHO for pulmonary TB patients with hypoxemia (WHO, 2025). Overall, this combined intervention effectively improves respiratory function, sleep quality, patient

Discussion

Based on the results of nursing evaluations conducted over three days (November 22–24, 2024), the patient diagnosed with pulmonary tuberculosis showed positive clinical progress after receiving interventions according to the nursing care plan. At the start of treatment, the patient exhibited ineffective breathing patterns with a respiratory rate of 27 breaths per minute, use of accessory breathing muscles, and thick sputum and rales on auscultation. In addition, the patient also experienced sleep disturbances due to shortness of breath that often occurred at night. However, after nursing interventions such as airway management, effective coughing exercises, nebulization, oxygen therapy, and pursed lips breathing (PLB) exercises, there was a significant improvement on the second and third day. Respiratory rate decreased to 20 breaths per minute, oxygen saturation increased from 93% to 97%, sputum decreased, and the patient was able to rest with better sleep quality. The clinical improvement observed can be attributed to the synergistic effects of the various therapeutic interventions administered simultaneously. Although it is difficult to identify the individual contribution of each intervention due to the short observation period and the simultaneous administration of all interventions, the clinical results are consistent with existing evidence supporting each component of the care plan. Nebulization with Flutison and Ventolin plays a role in thinning secretions, moisturizing the airways, and facilitating bronchodilation to overcome airway obstruction (Yan, 2025).

Oxygen therapy directly corrects hypoxemia, as evidenced by a progressive increase in oxygen saturation from 93% to 97% (WHO, 2025).

Airway management and coughing exercises effectively increase sputum clearance, thereby reducing respiratory workload. Meanwhile, PLB exercises specifically target breathing pattern efficiency by maintaining positive pressure in the airways during exhalation, preventing alveolar collapse, and improving gas exchange (Amiar & Setiyono, 2020; Santi, 2024; Shafiq et al., 2022). The temporal relationship between the implementation of this combination of interventions and clinical improvement supports the validity of a holistic approach, although causality cannot be attributed to a single intervention alone.

From a practical perspective, this case demonstrates that non-pharmacological therapies such as PLB can effectively complement pharmacological therapies in managing respiratory disorders in patients with pulmonary tuberculosis. PLB has high clinical value because it is simple, safe, cost-effective, and can be taught to patients to perform independently, thus having the potential for long-term sustainability beyond acute care. The integration of evidence-based non-pharmacological interventions with standard medical therapy represents a patient-centered approach that addresses both physiological needs and comfort.

Overall, these findings confirm that a holistic nursing approach integrating PLB exercises, nebulization, oxygen therapy, airway management, and cough training is a valid, effective, and ethical strategy in respiratory nursing practice for pulmonary tuberculosis patients. Although the individual contributions of each intervention cannot be isolated, the collective evidence supports the clinical value of combining non-pharmacological techniques with pharmacological therapy. This case contributes to the growing body of knowledge on multimodal respiratory management and underscores the importance of collaboration between evidence-based scientific approaches and clinical practice oriented toward patient comfort and functional outcomes.

Patient perspective

The patient reported that the pursed-lip breathing therapy she received during treatment was beneficial in helping reduce shortness of breath, resulting in easier breathing. Furthermore, she felt more relaxed during the

therapy and was able to follow the nurse's instructions effectively. She also expressed her readiness to continue the therapy regularly, as recommended by her healthcare provider.

Informed Consent

The patient received a clear and comprehensive explanation of the purpose, implementation stages, benefits, and potential risks of the nursing care and pursed lip breathing intervention. After understanding this information, the patient voluntarily agreed to participate in the study by signing an informed consent form. This consent process was carried out in accordance with applicable research ethics and clinical practice principles.

Conclusion

Effective coughing exercises and sleep support showed significant clinical improvement. PLB increased oxygen saturation from 93% to 97%, reduced respiratory rate from 27 to 20 breaths per minute, facilitated sputum expectoration, and improved sleep quality. These findings confirm that PLB, as a simple and cost-free non-pharmacological intervention, effectively improves respiratory function and quality of life in pulmonary tuberculosis patients. A holistic approach integrating non-pharmacological and pharmacological interventions is the optimal strategy for comprehensive nursing care.

Consent for publication

Written consent was obtained from the patient for the use and publication of anonymized clinical data. The patient was informed that personal identification would not be disclosed and that all data would be presented without identifying information.

Declarations

This research was conducted in accordance with applicable research ethics principles. All necessary patient consents were obtained, with patients agreeing to participate in this study by signing an informed consent form. Patients understand that their personal identities, including names and initials, will not be disclosed in publications, and that every effort has been made to maintain data confidentiality, although absolute anonymity cannot be guaranteed. This research was conducted in accordance with the research ethics principles outlined in the Declaration of Helsinki.

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