



Application of Pursed Lip Breathing Exercises to Reduce Fatigue in Pulmonary Tuberculosis Patients

Affiah Delfia Putri¹, Ani Nuraeni²

Applied Undergraduate Study Program and Nursing Profession, Polytechnic of the Ministry of Health Jakarta 1, Jakarta, Indonesia¹

Nursing Department, Health Polytechnic of the Ministry of Health Jakarta 1, Jakarta, Indonesia²

Abstract

Aims: Pursed Lips Breathing Exercises have been widely used as a non-pharmacological therapy that can help improve the comfort of patients with pulmonary tuberculosis. This breathing exercise helps improve lung expansion and gas exchange, which can reduce fatigue. Therefore, this case study was conducted to analyze the application of pursed lip breathing exercises to reduce fatigue levels in patients with pulmonary tuberculosis. **Methods:** The method used is a case study with a focus on the application of pursed lip breathing exercises to reduce the level of fatigue felt by pulmonary tuberculosis patients. The application of pursed lip breathing exercises is carried out by measuring the level of fatigue using the fatigue assessment scale (FAS) before and after the intervention. This exercise is given for two consecutive days with a duration of 20 to 30 minutes. **Results:** After the lip-pursing breathing exercise was performed, there was a decrease in the level of fatigue felt by patients with pulmonary tuberculosis. This decrease was measured through the results before and after the exercise was given. The measurements were carried out using a fatigue assessment scale (FAS) questionnaire. The results obtained before the afternoon were 36 and after the afternoon the score was 30. **Conclusion:** Pursed lip breathing exercises therapy given to patients with pulmonary tuberculosis on the level of fatigue decreased. Based on the results of fatigue assessment scale (FAS) measurements before and after the action was given. Therefore, the provision of this therapy is related to increasing comfort and reducing fatigue felt.

Keywords:

Tuberculosis,
Breathing,
Fatigue,
Pursed Lips Breathing Exercises

Corresponding Author:

Ani Nuraeni
Email: aninuraeni570@gmail.com



This is an open access article under the CC BY license.

INTRODUCTION

Tuberculosis, commonly called TB, is an infectious disease that is currently still a global public health problem. This disease is caused by the bacterium *Mycobacterium Tuberculosis*, which usually attacks the lungs. This transmission occurs through someone who has active TB with BTA Positive who releases droplets when coughing or sneezing. These droplets can be inhaled into other people and can cause infection (Syamsuddin et al., 2023).

Clinical manifestations of pulmonary tuberculosis vary depending on the severity. The most common symptoms experienced by patients with pulmonary tuberculosis are coughing for more than two weeks, night sweats without cause, decreased appetite, shortness of breath, coughing up blood, and weakness or malaise. Meanwhile,

in patients with extrapulmonary TB such as TB spondylitis, the symptoms are characterized by infiltration of lymphocytes and epithelioid cells that develop into tissue necrosis and form abscesses (Kemenkes RI, 2024).

Based on World Health Organization data from 2023, the largest cases of tuberculosis occurred in the Southeast Asia Region with 45% of cases, followed by Africa with 24%, and the Western Pacific with 17%. Meanwhile, around 87% of tuberculosis cases occurred in 30 countries with a high tuberculosis burden, namely Bangladesh, China, India, Nigeria, Pakistan, and the Philippines. WHO has set a target of eliminating tuberculosis by 2050, with a decrease in incidence to less than 1 case per 1 million population (World Health Organization, 2025).

Based on data from the Indonesian Ministry of Health in 2025, it was found that throughout 2024 there will be 889,000 cases of tuberculosis recorded in Indonesia, with the most cases in Java, North Sumatra, and South Sulawesi. Meanwhile, the estimated number of tuberculosis cases as of March 2025 reached 1,090,000 cases with 66,797 active cases and 45,796 cases being treated (Kementerian Kesehatan RI, 2025).

One of the most common impacts experienced by patients with pulmonary tuberculosis is impaired oxygenation. Tuberculosis sufferers will experience shortness of breath and can inhibit the process of oxygen entering the body. If this need is not met, the metabolic process will be disrupted, causing fatigue. Conditions like this, if they occur for a long time, can lead to brain tissue damage and risk of death (Rofi'i, 2021). Pulmonary tuberculosis can cause various complications if not treated according to the procedures and management of tuberculosis. Complications that are likely to occur are divided into two categories, namely early complications and advanced complications. Early complications include pleurisy, pleural effusion, emphysema, laryngitis, and digestive tract disorders. Meanwhile, advanced complications include respiratory tract obstruction, ARDS, post-TB obstruction syndrome, severe lung parenchymal damage, pulmonary fibrosis, and lung carcinoma (Nisak et al., 2021).

One of the effective non-pharmacological nursing interventions to reduce the symptoms felt by tuberculosis patients is pursed lip breathing exercises. Pursed lips breathing exercises are a technique that is done by inhaling air through the nose and then exhaling slowly with pursed lips with a prolonged expiration time. Pursed lip breathing can help improve oxygen transport and control breathing patterns to be slow and deep to help prevent lung collapse (Smeltzer, 2013). This technique involves regulating breathing through the mouth in a certain position. This implementation can help increase the amount of oxygen in the body and improve oxygen saturation (Pakaya & Kaharu, 2023). With pursed lips breathing exercises, it is also possible to improve ventilation and increase the performance of abdominal and thoracic muscles. Special respiratory muscle training will result in increased maximum ventilation capacity, improve quality of life, and help reduce complaints of shortness of breath (Pakaya & Kaharu, 2023).

The application of pursed lip breathing exercises is very necessary to improve understanding of fatigue felt by tuberculosis patients and provide useful information. The purpose of this case study is to analyze the application of pursed lip breathing exercises to reduce fatigue levels in pulmonary tuberculosis patients.

METHOD

The method used is a case study, namely research involving only one patient with certain criteria. This case study was conducted to gain a deeper understanding of the effectiveness of pursed lip breathing exercises and research analysis that focuses on one subject in detail, including subjective responses to the intervention and this method. Data were analyzed using a qualitative approach (patient experience narrative) and quantitative (measurement of fatigue level scale before and after intervention). Data collection was carried out through observation, anamnesis, interviews, and e-RM. The main thing that is done during observation and interviews is subjective patient complaints and observation of clinical signs such as vital signs. E-RM information as an addition if the patient is still given or there is additional medication. The instruments used are a tensiometer, oximeter, and fatigue level measurement, namely the fatigue assessment scale (FAS). The use of scales and monitoring of vital signs in monitoring fatigue felt by patients will be recorded on the observation sheet.

Data analysis using pre-intervention and post-intervention observation monitoring of pursed lips breathing exercises given twice a day for two consecutive days with a duration of about 20 to 30 minutes. This action was applied and vital signs were observed before and after the intervention was given.

During the implementation process, the patient will be accompanied by family members to be given education and direct guidance to perform pursed lip breathing exercises according to the established SOP, namely providing the patient with a comfortable and relaxed position (semi-Fowler), directing the patient to position the right hand on the chest and the left hand on the stomach, directing the patient to inhale through the nose for 4 seconds, hold for 2 seconds, then exhale from the mouth with the lips rounded for 8 seconds, encouraging to repeat 5 to 10 times independently.

RESULT AND DISCUSSION

Based on the implementation carried out and evaluation for four days when providing nursing care to patients from May 5 to 8, 2025, which has been described as follows:

The implementation of pursed lip breathing exercises intervention was carried out on patients managed with a diagnosis of pulmonary tuberculosis on OAT to reduce the complaints of fatigue felt. Pursed lips breathing exercises were carried out for 2 days with a duration of about 20–30 minutes. Vital signs were monitored, assessing the level of fatigue using the fatigue assessment scale (FAS) before and after the intervention was given, to monitor the results of changes in vital signs, namely heart rate, blood pressure, and SPO2. The implementation of pursed lips breathing exercises steps include: before the action is given, re-assess the patient's condition before taking the action, give the patient a comfortable and relaxed position (semi-fowler), encourage the patient to position the right hand on the chest and the left hand on the stomach, encourage the patient to inhale through the nose for 4 seconds, hold their breath for 2 seconds, then exhale from the mouth with the lips rounded (pursing) for 8 seconds, make sure the chest wall expands during inspiration, encourage repeating 5 to 10 times independently. The following are the monitoring results from the provision of pursed lip breathing exercises, namely:

Table 1. Fatigue Assessment Scale (FAS) Measurement Results

Measurement <i>Fatigue Assessment Scale (FAS)</i> Day-1 (Wednesday, 07 May 2025)	Measurement <i>Fatigue Assessment Scale (FAS)</i> Day-2 (Thursday, 08 May 2025)
Total Score	
36	30

Table 2. Results Pursed Lip Breathing Exercises

Results	
Before doing Pursed Lips Breathing Exercises	After doing Pursed Lips Breathing Exercises
Day-1 (Wednesday, 07 May 2025)	
The patient complained of shortness of breath and chest pain, blood pressure 117/82 mmHg, HR 87x/minute, SPO2 91%, FAS 36	The patient said the pain and shortness of breath decreased, Blood pressure 116/87 mmHg, HR 89x/minute, SPO2 93%.
Day-2 (Thursday, 08 Mei 2025)	
The patient said he was tired and short of breath, blood pressure 125/81 mmHg, HR 81x/minute, SPO2 91%.	The patient said that shortness of breath was reduced and more comfortable, Blood pressure 115/87 mmHg, HR 79x/minute, SPO2 94%, FAS 30.

Pursed lip breathing exercises were performed on patients starting on May 5, 2025. The patient named Mr. A person with a diagnosis of pulmonary tuberculosis on OAT complained of shortness of breath, stomach and chest felt hot like burning but did not spread with a pain scale of 3, had coughed up phlegm for the past 2 weeks, and experienced weight loss. The results of the vital signs examination on May 7, 2025, before being given pursed lip breathing exercises were that the patient said shortness of breath and chest pain, BP 117/82 mmHg, HR 87x/minute, SPO2 91%, FAS 36. After the pursed lip breathing exercises intervention and evaluation, the results obtained were that the patient said the pain and shortness of breath had decreased, BP 116/87 mmHg, HR 89x/minute, SPO2 93%.

On May 8, 2025, before the application of pursed lips breathing exercises, an assessment was carried out. Namely, the patient said he was tired and short of breath, BP 125/81 mmHg, HR 81x/minute, SPO2 91%. After the intervention of pursed lip breathing exercises and an evaluation, the results obtained were that the patient said his shortness of breath had decreased and was more comfortable, BP 115/87 mmHg, HR 79x/minute, SPO2 94%, FAS 30.

Discussion

Implementation of pursed lip breathing exercises is an effective non-pharmacological therapy of choice. The application of pursed lip breathing exercises has an effect on the level of fatigue in patients with pulmonary tuberculosis and the provision of this therapy has been proven to overcome fatigue experienced by patients. The application of pursed lips breathing exercises has been carried out on Mr. A, the results obtained were a decrease in fatigue felt by the patient. On the first day, the patient said that the pain and shortness of breath decreased with BP 116/87 mmHg, HR 89x/minute, SPO2 93%, fatigue assessment scale (FAS) measurement 36. On the second day, the results showed that the patient said he was more comfortable with BP 115/87 mmHg, HR 79x/minute, SPO2 94%, with fatigue assessment scale (FAS) measurement of 30. So, in addition to a decrease in fatigue, there were also changes in vital signs. This is supported by research conducted by (Pakaya & Kaharu, 2023) That regular pursed lip breathing exercises are very effective in patients with pulmonary tuberculosis who experience shortness of breath because it will reduce the burden on the respiratory muscles. In this exercise, patients are asked to exhale naturally. In this way, it can increase the strength of intra-abdominal muscle contractions, so that intra-abdominal pressure also increases. With increasing intra-abdominal pressure, it will naturally cause greater diaphragm movement, which causes the chest cavity to become smaller. The smaller the chest cavity, the higher the pressure in the intra-alveolar. By increasing the amount of oxygen entering the pulmonary capillaries, it can increase lung volume and respiratory rate.

After performing pursed lips breathing exercises, the patient's fatigue level was measured again using the Fatigue Assessment Scale (FAS). The results showed a significant decrease in fatigue Namely, on the first day it was 36 and on the second day it was 30. This is supported by research conducted by (Amiar & Setiyono, 2020) That pursed lips breathing exercises have a positive effect on fatigue felt by tuberculosis patients. This technique can help slow the respiratory rate and increase the efficiency of lung ventilation. By extending the expiration phase, pursed lip breathing exercises can prevent alveolar collapse and increase the rate of gas exchange so that blood oxygen levels are more optimal and respiratory muscle work is reduced so that the body does not need to expend excess energy to breathe.

The application of pursed lip breathing exercises is also able to improve breathing frequency, breathing patterns, and saturation, so that pursed lips breathing exercises are effective in increasing respiratory muscle capacity and tidal volume. This is supported by research conducted by (Astuti et al., 2024) That this breathing exercise aims to increase ventilation to the maximum. At the stage of pursing the lips, it also aims to slow down expiration and prevent lung collapse and control the frequency of breathing into breathing and increase oxygen levels in the blood..

Latihan pursed lips breathing exercises ini juga didukung oleh motivasi dan keinginan pasien untuk sembuh sehingga hasil yang ditunjukkan terlihat lebih cepat. Hal ini didukung oleh penelitian yang dilakukan oleh (Safitri et al., 2023) Pursed lip breathing exercises are also supported by the patient's motivation and desire to recover so that the results shown are seen faster. This is supported by research conducted by (Safitri et al., 2023) that motivation for recovery for tuberculosis sufferers is very much needed, because motivation can be one way to accelerate patient recovery through the strength that arises from within themselves. With motivation and the desire to recover, it can encourage and strengthen behavior and provide direction to individuals with the aim of the individual achieving the target of recovery.

Limitation

In the implementation of the intervention on the application of pursed lip breathing exercises to reduce fatigue in pulmonary tuberculosis patients, the authors had limited implementation time, which was only carried out for two days and was only carried out on one patient, so that there was no comparison to find out more about the impact of the intervention carried out.

Contribution To Global Nursing Practice

The application of pursed lip breathing exercises is a non-pharmacological intervention that has many benefits. Besides being able to improve breathing frequency, breathing patterns, and saturation, pursed lip breathing exercises are also able to reduce fatigue felt by patients with pulmonary tuberculosis. Thus, literacy related to pursed lip breathing exercises can be added to education as a form of holistic nursing care integration. So that it is expected to increase the competence of nurses in utilizing this exercise to overcome patient discomfort and it can be used as quality education for patients, both among nurses and prospective nurses.

CONCLUSION

The application of pursed lip breathing has been proven effective in reducing fatigue in patients with pulmonary tuberculosis. In addition to fatigue, this application can reduce blood pressure, pulse, and increase saturation. Therefore, the provision of non-pharmacological interventions of pursed lip breathing exercises to reduce fatigue levels in patients with pulmonary tuberculosis is related to increasing comfort and reducing fatigue.

Author Contribution

All authors have accepted responsibility for the entire content of this manuscript and approved its submission.

Conflict Of Interest

Authors state no conflict of interest.

Acknowledgment

The authors would like to thank the hospital staff for their assistance in the data collection process.

REFERENCES

- Amiar, W., & Setiyono, E. (2020). Efektivitas Pemberian Teknik Pernafasan Pursed Lips Breathing dan Posisi Semi Fowler Terhadap Peningkatan Saturasi Oksigen Pada Pasien TB Paru. *Indonesian Journal of Nursing Sciences and Practice*, 3(1). <https://doi.org/https://doi.org/10.24853/ijnsp.v3i1.7-13>
- Astuti, W., Ningrum, C., Prasasti, R., & Mustabela, I. (2024). Penerapan Pursed Lips Breathing Terhadap Pola Napas Tidak Efektif Pada Pasien Tuberkulosis. 478–483. <https://jmm.ikestmp.ac.id/index.php/maskermedika/article/view/716/542>
- Kemendes RI. (2024). *Waspada Penularan dan Gejala TBC*. https://keslan.kemkes.go.id/view_artikel/3113/waspada-penularan-dan-gejala-tbc
- Kementerian Kesehatan RI. (2025). *Aksi Nyata Percepatan Eliminasi Tuberkulosis di Indonesia*. <https://kemkes.go.id/id/47510>
- Nisak, Z., Dyah, Y., & Santik, P. (2021). Indonesian Journal of Public Health and Nutrition Kejadian Tuberkulosis: Studi Kasus di Wilayah Kerja Puskesmas Article Info. *Ijphn*, 1(3), 783–792. <http://journal.unnes.ac.id/sju/index.php/IJPHN>
- Pakaya, N., & Kaharu, M. R. (2023). Efektivitas Terapi Pursed Lips Breathing dan Posisi Semi Fowler terhadap Penurunan Sesak Napas Pasien Tuberculosis: Literature Review. *Jambura Journal of Health Science and Research*, 5(4), 1155–1165.
- Rofi'i, M. (2021). Implementasi Keperawatan Tuberculosis Paru dengan Bersihan Jalan Napas Tidak Efektif dan Nutrisi Tidak Seimbang: Kurang dari Kebutuhan Tubuh. *Holistic Nursing and Health Science*, 4(1), 56–61. <https://doi.org/10.14710/hnhs.4.1.2021.56-61>
- Safitri, S. W., Parmin, S., & Sakinah, W. (2023). Analisis Komunikasi Terapeutik Perawat dan Motivasi Terhadap Tingkat Kesembuhan Pasien TBC di Puskesmas Merdeka. *Nanggroe: Jurnal Pengabdian Cendikia*, 2(4), 451–458. <https://jurnal.penerbitdaarulhuda.my.id/index.php/NJPC/article/view/665/687>
- Smeltzer, S. C. (2013). *Keperawatan Medikal Bedah (Handbook for Brunner&Suddarth's textbook of Medical-Surgical Nursing) Edisi 12*.
- Syamsuddin, F., Puluholawa, N., & Nabu, S. D. (2023). Laporan Kasus Pada Pasien Tuberculosis Paru dengan Masalah Keperawatan Defisit Nutrisi di RSUD Prof. Dr. H. Aloei Saboe Kota Gorontalo. *Muhammadiyah Journal of Nutrition and Food Science (MJNF)*, 4(2), 120. <https://doi.org/10.24853/mjnf.4.2.120-128>
- World Health Organization. (2025). *Tuberculosis*. https://www-who-int.translate.google/news-room/fact-sheets/detail/tuberculosis?_x_tr_sl=en&_x_tr_tl=id&_x_tr_hl=id&_x_tr_pto=tc