Implementing semi-fowler position and pursed lip breathing in acute bronchitis exacerbation

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Abstract

acute exacerbation bronchitis is a common respiratory condition that significantly affects patient well-being, especially in elderly individuals. Non-pharmacological interventions like the Semi-Fowler position (SFP) and pursed lip breathing (PLB) have shown potential in improving respiratory function. This study aims to evaluate the effectiveness of SFP and PLB in improving oxygen saturation, reducing sputum production, and alleviating wheezing in a patient with acute bronchitis exacerbation. An 80-year-old female patient with acute bronchitis exacerbation was treated SFP and PLB over a three-day period. Clinical parameters such as respiratory rate, oxygen saturation, sputum production and wheezing were monitored. The patient showed significant improvement: oxygen saturation increased from 93% to 99%, sputum production decreased from 4 to 2, and wheezing reduced from 4 to 1.

SFP and PLB proved effective in improving respiratory function in acute bronchitis exacerbation, providing a valuable adjunct to pharmacological treatments.

Keyword: Acute Bronchitis; Semi-Fowler position; Pursed Lip Breathing; Oxygen Saturation; Sputum Production; Wheezing

1. Introduction

Acute bronchitis is common respiratory condition that frequently leads to exacerbations, causing significant morbidity and healthcare burden worldwide (Viegi et al., 2020). This condition, often triggered by viral infections, is characterized by inflammation of the bronchial tubes, resulting in cough, wheezing, and difficulty breathing (Kızılırmak & Yorgancıoğlu, 2023). Exacerbations of acute bronchitis can worsen symptoms and may increase the risk of progression to chronic obstructive pulmonary disease (COPD) or other respiratory complications (Hogea et al., 2020). As such, effective management strategies for alleviating symptoms and improving respiratory function are critical in clinical practice.

Traditional treatment for acute bronchitis exacerbation primarily focuses on pharmacological interventions, such as bronchodilators, steroids, and sometimes antibiotics, depending on the etiology (Ko et al., 2016). However, there is growing evidence supporting the role of non-pharmacological interventions in enhancing patient comfort and improving clinical outcomes. Among these, positioning techniques and breathing exercises have emerged as effective adjuncts in managing respiratory distress, particularly in individuals with compromised lung function (Alotaibi, 2023).

One such intervention is the Semi-Fowler position, a therapeutic positioning technique where the patient is positioned with the head elevated at a 30–45-degree angle (Ismail et al., 2021). This position is known to aid in optimizing respiratory mechanics by improving diaphragm function and decreasing the work of breathing (Sihombing & Lisnawati, 2024). It is particularly beneficial in patients experiencing respiratory distress, as it helps reduce the pressure on the diaphragm and improves ventilation-perfusion ratio (Maizura et al., 2023). Despite its simplicity, the Semi-Fowler position has been underutilized in acute bronchitis exacerbations, which presents an opportunity for clinical improvement.

In addition to positioning, breathing exercise such as pursed lip breathing (PLB) has shown promising results in improving respiratory function in patients with chronic respiratory condition (Huang et al., 2024). PLB involves exhaling slowly through pursed lips, which creates a back pressure that helps keep the airways open longer and promotes more effective exhalation (Yang et al., 2022). This technique has been particularly beneficial in managing chronic obstructive disease and is gaining recognition as a useful intervention for acute exacerbations as well (Jeyachandran &

Hurst, 2022). Combining the Semi-Fowler position with pursed lip breathing offers a holistic approach to managing acute bronchitis exacerbation, addressing both the mechanical and physiological aspects of breathing (Shanbhag et al., 2022).

This case study examines the implementation of both the Semi-Fowler position and pursed lip breathing in a patient with acute bronchitis exacerbation. The goal is to explore how these interventions, when applied together, can alleviate respiratory distress and improve clinical outcomes in such patients. By sharing the experience, the study aims to provide insights for healthcare providers and contribute to the growing evidence supporting non-pharmacological approaches in managing respiratory conditions.

As the global burden of acute bronchitis rises, particularly in developing regions, the need for simple, effective interventions has never been greater (Al-Worafi, 2024). This study underscores the importance of integrating cost-effective, non-invasive strategies into clinical practice. By doing so, healthcare providers can enhance patient care, reduce the reliance on medications, and improve the overall recovery process for individuals suffering from acute bronchitis exacerbation.

2. Methods

This case study focuses on an 80-year-old of female patient who was admitted to Azzahra ward inpatient of PKU Muhammadiyah Gamping Yogyakarta Hospital, Indonesia, from June 10 to 12, 2025, due to an acute exacerbation of bronchitis. The primary aim of this study was to implement non-pharmacological interventions, specifically the Semi-Fowler position and pursed lip breathing, and to evaluate their impact on the patient's clinical outcomes. This approach followed a comprehensive, systematic assessment and intervention plan based on Indonesian nursing standards: SDKI (Indonesian Standard Nursing Diagnosis), SLKI (Indonesian Standard Nursing Outcomes), and SIKI (Indonesian Standard Nursing Interventions).

2.1. Physical Examination (Head to Toe)

Upon admission, a through physical examination was conducted using a head-to-toe approach to assess the patient's overall health status and identify any abnormal findings related to the respiratory system. The physical examination was divided into the following components: [1] Inspection: the patient's general appearance was observed, noting any signs of respiratory distress, such as labored breathing, cyanosis, or use of accessory muscles. [2] Palpation: chest expansion was assessed for symmetry and tenderness. Palpation of the neck and clavicular area helped detect any lymphadenopathy or signs of discomfort. [3] Percussion: percussion of the chest was performed to assess for areas of dullness, indicating possible consolidation, or hyper-resonance, which could suggest air trapping. [4] Auscultation: breath sounds were auscultated using the stethoscope to identify abnormal lung sounds, including wheezing, crackles, or decreased breath sounds, which are characteristic of bronchitis exacerbation (Novianti, 2025).

2.2. Laboratory Examination

In addition to physical examination, a full set of diagnostic tests was performed to evaluate the extent of the patient's respiratory distress and to rule out other underlying conditions. These tests included (Ajibowo et al., 2022): Laboratory tests: blood samples were taken to assess for markers of infection, such as elevated white blood cell count, and to evaluate the patient's renal function and electrolyte balance. Chest X-ray: a chest X-ray was ordered to rule out pneumonia or other lung pathologies that could mimic or exacerbate the symptoms of acute bronchitis. Sputum analysis was conducted to identify the presence of pathogens, including bacteria or viruses, and to determine the appropriate treatment plan based on the microbial findings.

2.3. Hospitalization and Care Plan

The patient was hospitalized for a period of three days, from June 10 to 12, 2025, during which the nursing team implemented a comprehensive care plan based on the nursing diagnosis formulated using SDKI, SLKI, and SIKI. The care plan focused on managing the acute bronchitis exacerbation through non-pharmacological interventions such as positioning the patient in the Semi-Fowler

position and encouraging pursed lip breathing (Shanbhag et al., 2022). The nursing interventions also included monitoring vital signs, respiratory function, and patient comfort. The nursing outcomes (SLKI) aimed at improving the patient's respiratory function, alleviating symptoms of bronchitis exacerbation, and ensuring overall patient stability. The nursing interventions (SIKI) involved continuous assessment and adjustment of the care plan to meet the patient's evolving needs.

2.4. Nursing Diagnosis

The nursing diagnosis was formulated using the three Indonesian nursing standards: SDKI, SLKI, and SIKI. The diagnosis focused on the patient's compromised respiratory function, including ineffective airway clearance and impaired gas exchange, both of which are common in acute bronchitis exacerbation. These diagnoses formed the foundation for the development of an individualized care plan that aimed to address the immediate needs of the patient while also promoting long-term respiratory health.

2.5. Data Collection and Analysis

Data was collected through patient observation, physical examinations, laboratory tests, and the evaluation of nursing interventions. The results were analyzed to assess effectiveness of the care plan, focusing on improvements in the patient's breathing patterns, reduction of bronchitis symptoms, and overall recovery within the three-day hospitalization period. This case study also aimed to contribute to the body of knowledge on effective management of acute bronchitis exacerbation, particularly through non-pharmacological approaches.

3. Results and Discussion

3.1. Result

The patient, diagnosed with acute exacerbation of bronchitis and secondary dyspepsia, was admitted on June 10, 2025. Key findings included elevated blood pressure (174/87 mmHg), bronchitis, and mild cardiomegaly on the chest X-ray. Blood tests showed electrolytes imbalances. The patient was treated with nebulization, antibiotics, and was discharged with medications like acetylcysteine and cefixime (Table 1). The patient appeared pale and weak, with slightly dry lips. Blood pressure was slightly down at 143/70 mmHg, and wheezing was noted during auscultation. The gastrointestinal system showed no major issues, while neurological and musculoskeletal system were normal. The patient had a left leg wound and inconsistent oral hygiene (Table 2). The chest X-ray confirmed bronchitis and mild cardiomegaly, with bronchial wall thickening indicating inflammation. Mild cardiomegaly suggests cardiovascular strain, possibly aggravated by the respiratory condition (Table 3).

Sputum analysis revealed Pseudomonas oryzihabitants, which was resistant to several antibiotics but sensitive to levofloxacin and tobramycin. This necessitated tailored antibiotic therapy based on sensitivity testing (Table 4). Nursing diagnoses included ineffective airway clearance, impaired gas exchange, and activity intolerance. Interventions focused on improving airway clearance, oxygen saturation, and activity tolerance through positioning, breathing exercises, and nebulization (Table 5). On day 1, the patient had shortness of breath, requiring oxygen therapy at 3 LPM. By day 2, oxygen was increased to 4 LPM, and patient improved continued nebulization. By Day 3, the patients reported no shortness of breath, with stable oxygen saturation at 99% (Table 6).

Table 1. Patient Summary and Clinical Findings

Parameter	Details
Main diagnosis	Acute Exacerbation of Bronchitis
Secondary diagnosis	Dyspepsia
Vital signs	Temp: 36.4°C, Pulse: 87 bpm, Respiratory rate: 20 bpm, BP: 174/87 mmHg
Laboratory results (blood)	Sodium: 135, Potassium: 3.4, Chloride: 106, Creatinine 0.53, Urea: 18.2, Hb: 12.3, AL: 10.38, Neutrophils: 87, Hematocrit: 37.1 AT: 208, Blood glucose: 111
Urine test results	Leukocytes: 0-1, Ketones: negative, Protein: negative

Radiology (Chest X-ray)	Findings bronchitis and mild cardiomegaly
Therapies administered	Ampisulbact, Methylprednisolone, Ventolin Pulmicort Nebulization, NAC, Pantoprazole, Sucralfate syrup
Discharge Medication	Acetylcysteine 200mg (every 8 hours), Sucralfate syrup 10 cc (every 8 hours), Lansoprazole 30mg (once daily), Cefixime 200 mg (every 12 hours), Amlodipine 10 mg (once daily)

Table 2. Physical Examination Findings

System	Findings
General appearance	Pale, weak, slightly depressed expression, with clean hygiene
Vital signs	Blood pressure 143/70 mmHg
Respiratory system	Wheezing during auscultation
Cardiovascular system	Slightly dry lips, normal jugular venous pressure, normal heart size, apex beat at intercostal 4
Gastrointestinal system	Slightly dry lips, full abdomen, no masses, bowel sound (+)
Nervous system	Clear memory, emotional response, full consciousness (GCS 15)
Sensory function	Normal pain, temperature, vibration, and position sensation
Musculoskeletal system	No edema in feet and legs
Integumentary system	Skin wound on left leg
Endocrine system	No thyroid enlargement
Urinary system	No edema in eyelids, face, or body
Immunological system	No allergies reported
Hygiene	Inconsistent oral hygiene during hospitalization
Sleep and rest	Difficulty sleeping post hospitalization due to discomfort

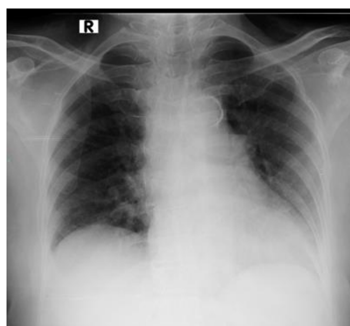

Figure 1. Chest X-ray Examination

Table 3. Thoracic Examination Findings

Examination Parameter	Findings
Chest X-ray	Bronchitis and mild cardiomegaly
Radiological description	- Bronchial wall thickening or inflammation, indicative of bronchitis - Mild enlargement of the heart, suggesting cardiomegaly
Interpretation	- The presence of bronchitis is confirmed with changes seen in the bronchial region, likely contributing to the patient's wheezing and respiratory distress - Mild cardiomegaly suggests the patient may have underlying cardiovascular strain, possibly exacerbated by respiratory distress.

Table 4. Sputum Examination Results

Examination Parameter	Findings
Gram staining (microscopic examination)	- Gram negative rods - Gram negative cocci - Presence of PMN cells (polymorphonuclear leukocytes)
Bacterial identification	- Pseudomonas oryzihabitans identified in the sputum sample
Antibiotic sensitivity testing	- Sensitive (S): Levofloxacin (18), Tobramycin (22) - Intermediate (I): Amoxiclav (18)

Examination Parameter	Findings
	- Resistant (R): Amikacin (10), Ceftriaxone (16), Cefazolin (≥23), Ciprofloxacin (14), Gentamicin (11), Meropenem (18)
Interpretation	- The sputum sample revealed the presence of *Pseudomonas oryzihabitans,* a bacterium often associated with respiratory infection - The bacteria showed resistance to several common antibiotics, indicating the need for alternative therapies
Recommendation	- Consider antibiotic therapy based on sensitivity pattern, especially using levofloxacin or tobramycin

Table 5. Priority Nursing Diagnoses, Outcomes, and Interventions

Nursing Diagnosis (SDKI)	Outcome (SLKI)	Intervention (SIKI)
Ineffective Airway Clearance	Improve airway clearance	- Positioning patient in Semi-Fowler position to enhance respiratory function - Educate patient in PLB to facilitate better airflow - Teach effective coughing techniques to help clear the airway - Administer nebulization and bronchodilator as prescribed
Impaired Gas Exchange	Increased oxygen saturation (SpO_2) within normal range 97-100%	- Monitor respiratory status regularly - Provide oxygen therapy via nasal cannula as needed to maintain SpO_2 - Monitor oxygen saturation levels regularly and adjust oxygen flow rate as necessary - Encourage deep breathing exercises to enhance ventilation
Activity Intolerance	Increased tolerance to activities with no signs of dyspnea	- Monitor patient's tolerance to activity and assist with gradual mobilization - Encourage rest periods between activities - Provide patient with strategies for energy conservation during daily activities.

Table 6. Physical Examination Results and Nursing Interventions

Date	Clinical Findings	Vital Signs	Intervention
June 10, 2025	Complaints of shortness of breath, coughing up phlegm	Respiratory rate: 21 bpm, Oxygen saturation: 98% with nasal cannula at 3 Lpm	- Semi-Fowler position - Education on PLB and effective coughing technique - Oxygen therapy 3 lpm
June 11, 2025	Persistent shortness but improved understanding of techniques	Respiration rate: 22 bpm, Oxygen saturation 93% (initial) increased 97% with 4 Lpm nasal cannula	- Increased oxygen flow (4 lpm) - Continued PLB and effective coughing exercise - Nebulization every 8 hours
June 12, 2025	No shortness of breath, comfortable breathing, no wheezing	Respiration rate: 20 bpm, Oxygen saturation 99%	- Continued Semi-Fowler position - Ongoing monitoring of breathing patterns - Nebulization completed

3.2. Discussion

Acute exacerbation of bronchitis is a common condition that significantly impacts respiratory function, particularly in vulnerable populations such as the elderly. In this case study, the combination of non-pharmacological interventions, including the Semi-Fowler position (SFP) and pursed lip breathing (PLB), was assessed for its effectiveness in improving respiratory outcomes in a patient suffering from acute bronchitis exacerbation.

3.2.1. Impact of Non-Pharmacological Interventions

Acute exacerbation of bronchitis can severely affect respiratory function, particularly in elderly individuals. In this case study, two non-pharmacological interventions, SFP and PLB, were utilized to improve the patient's respiratory status. These interventions were effective in reducing wheezing, increasing oxygen saturation, and promoting sputum clearance. Their effectiveness aligns with existing research on their role in managing respiratory conditions (Rahmah et al., 2024; Purnamayanti et al., 2023).

3.2.2. Semi Fowler Position (SFP) and Its Role

The Semi-Fowler position, with the upper body elevated at a 30–45-degree angle, has long been recognized for its benefits in improving lung mechanics. This position reduces pressure on the diaphragm and promotes better lung expansion, which was evidenced by the patient's improvement in oxygen saturation levels from 93% to 99% over three days. These findings are consistent with previous studies that report the positive effects of SFP in enhancing ventilation and reducing shortness of breath in patients with respiratory distress (Soemah et al., 2024; Rehman et al., 2020).

3.2.3. Pursed Lip Breathing (PLB) and Its Effectiveness

PLB is a simple technique that involves inhaling through the nose and exhaling slowly through pursed lips, which creates a backpressure that helps keep the airways open and facilitates more effective exhalation. In this case PLB resulted in a reduction in wheezing from moderate level (4) to minimal (1) within two days. This reduction is supported by prior research, which highlights PLB as an effective intervention in improving airflow and reducing wheezing in patients with obstructive pulmonary conditions (Cai et al., 2024; Pangestu et al., 2025).

3.2.4. Impact on Sputum Production

Sputum production, a critical indicator of airway clearance, was rated on a scale of 1 to 5. Initially, sputum production was rated as 4, indicating significant mucus retention. By day 3, this decreases to a rating of 2, suggesting improved airway clearance. This reduction is likely due to the combined effects of PLB, nebulization therapy, and positioning, which help in mobilizing and expelling mucus. Studies have similarly shown that both PLB and SFP contribute to effective sputum clearance in respiratory patients (Rahmah et al., 2024).

3.2.5. Wheezing and Airway Patency

Wheezing, a common sign of bronchial constriction, was initially rated at 4 (moderate) and decreased to 1 (minimal) by day 3. This significant improvement in wheezing supports the hypothesis that both SFP and PLB help reduce bronchial constriction, thus improving airflow and reducing respiratory distress. This is consistent with previous clinical studies that demonstrate the effectiveness of these interventions in reducing wheezing in patients with bronchitis exacerbation (Pangestu et al., 2025).

3.2.6. Oxygen Saturation and Breathing Patterns

Oxygen saturation levels were closely monitored, showing an improvement from 93% to 99% over the course of three days. This improvement can be attributed to the synergistic effect of oxygen therapy, SFP, and PLB, all of which played a role in improving lung ventilation and reducing the work of breathing. The improvement in oxygenation was consistent with findings from previous studies, which have highlighted the benefits of SFP in enhancing oxygen saturation and reducing respiratory effort (Soemah et al., 2024).

3.2.7. Limitation of The Study

While this study shows promising results, there are limitations. The findings are based on a single case, which makes it difficult to generalize the results to a broader population. The lack of a control group further limits the ability to assess the comparative effectiveness of the interventions. Additionally, adherence to the interventions, especially PLB and positioning, may vary among

patients, which could influence the outcomes. Long term follow up was not performed, and thus, the sustainability of the improvements remains unknown. Future studies with larger sample sizes and randomized controlled designs are needed to validate these findings.

4. Conclusion

In conclusion, the use of the Semi-Fowler positioning and pursed lip breathing proved effective in improving the respiratory status of a patient with acute bronchitis exacerbation. These interventions resulted in significant, improvements in oxygen saturation, reduction of sputum production, and alleviation of wheezing. Although these results are promising, further research is needed to confirm the long-term efficacy and broader applicability of these interventions in diverse patient populations.

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Author Disclosure

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