



Application of Balloon Blowing Therapy in Improving Respiratory Function in Children with Bronchopneumonia in Pediatric Treatment Warning: A Case Report

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ABSTRACT

Bronchopneumonia is one of the leading causes of morbidity and mortality among children in Indonesia. It is characterized by inflammation of the lower respiratory tract, resulting in impaired respiratory function, including shortness of breath (tachypnea), secretion retention, and reduced pulmonary ventilation. One of the non-pharmacological nursing interventions that can be implemented to improve respiratory function is balloon blowing therapy. This therapy is a breathing exercise designed to enhance lung expansion, strengthen the respiratory muscles, facilitate secretion clearance, and provide a relaxation effect that supports the implementation of atraumatic care in children. This study aimed to describe the effect of balloon blowing therapy on respiratory function in a child diagnosed with bronchopneumonia at Prof. Dr. H. Aloei Saboe Regional General Hospital, Gorontalo City. The study employed a case study design involving a six-year-old child (M.A.E.) diagnosed with bronchopneumonia who presented with shortness of breath, difficulty expectorating sputum, and additional breath sounds (rhonchi). Balloon blowing therapy was administered as part of airway management for three consecutive days, with each session lasting 10–15 minutes. Evaluation was conducted by measuring the respiratory rate (RR) before and after the intervention and by observing the patient's clinical condition. The results demonstrated a gradual decrease in RR, from 39 to 37 breaths/minute on the first day, from 36 to 34 breaths/minute on the second day, and from 32 to 27 breaths/minute on the third day, reaching the normal range for the patient's age. In addition, shortness of breath decreased, sputum was expelled more easily, and rhonchi diminished. Balloon blowing therapy has the potential to improve respiratory function in children with bronchopneumonia and may be considered a complementary non-pharmacological nursing intervention. However, further studies involving larger sample sizes and more rigorous research designs are required to confirm its effectiveness.

1. INTRODUCTION

Children are individuals undergoing a process of growth and development that spans from infancy through adolescence. This period involves changes across physical, cognitive, emotional, and social domains, as well as in adaptive capabilities. Because a child's respiratory system is still developing, they are more susceptible than adults to respiratory dysfunction resulting from infections. Bronchopneumonia is one lower respiratory tract infection that remains a leading cause of morbidity and mortality among children (Noviana, 2024). The respiratory dysfunction associated with bronchopneumonia is characterized by an increased respiratory rate (tachypnea), reduced lung expansion, secretion retention, adventitious breath sounds, and impaired oxygenation; consequently, appropriate management is required to prevent more severe complications.

Bronchopneumonia is an acute infection of the bronchioles and alveoli that triggers an inflammatory process, mucosal edema, and the accumulation of secretions in the airways. This condition leads to reduced lung compliance, ventilation-perfusion mismatch, and impaired gas exchange within the alveoli. Consequently, the work of breathing increases, causing the child to

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exhibit tachypnea, chest wall retractions, the use of accessory respiratory muscles, and rhonchi, as well as difficulty clearing secretions. If this respiratory dysfunction is not promptly managed, it can lead to hypoxemia, respiratory muscle fatigue, and respiratory failure, while also prolonging hospital stays and increasing the risk of mortality in children. Bronchopneumonia remains a public health issue in many countries, particularly among children under five years of age.

According to data from the WHO and the Ministry of Health of the Republic of Indonesia, bronchopneumonia remains a leading cause of morbidity and mortality in children due to lower respiratory tract infections. Therefore, utilizing the latest epidemiological data (2023–2025) is essential to illustrate the magnitude of the disease burden. In Gorontalo Province, bronchopneumonia continues to be a significant cause of pediatric hospitalizations. Medical records from Prof. Dr. H. Aloei Saboe Regional General Hospital (RSUD) in Gorontalo City indicate 168 cases of pediatric bronchopneumonia between October 2025 and January 2026. This high caseload prompted the selection of this research site, as it demonstrates that bronchopneumonia remains a clinical issue requiring the development of nursing interventions to improve patients' respiratory function. Preliminary observations in the pediatric ward of Prof. Dr. H. Aloei Saboe RSUD revealed that most bronchopneumonia patients exhibited impaired respiratory function—manifesting as tachypnea, shortness of breath, adventitious breath sounds (rhonchi), and difficulty clearing secretions—alongside suboptimal implementation of breathing exercises as a supportive nursing intervention. These conditions highlight the need for non-pharmacological interventions that are easy to implement, safe, and appropriate for the characteristics of pediatric patients.

The management of bronchopneumonia encompasses both pharmacological and non-pharmacological therapies. Pharmacological treatment involves the administration of antibiotics, oxygen therapy, bronchodilators (as indicated), antipyretics, and fluid therapy. Meanwhile, non-pharmacological interventions serve as adjunct therapies to help improve respiratory function, enhance pulmonary ventilation, and accelerate the clearance of secretions. One such non-pharmacological intervention increasingly utilized in pediatric nursing practice is balloon-blowing therapy.

Balloon-blowing therapy is a breathing exercise involving the inflation of a balloon to generate positive expiratory pressure (PEP) during the expiratory phase. This positive pressure helps open collapsed alveoli, enhances lung expansion, improves alveolar ventilation, strengthens respiratory muscles, increases vital lung capacity, and mobilizes secretions from small airways to larger ones, making them easier to expel. Improvements in these mechanisms are expected to enhance respiratory function, evidenced by a reduced respiratory rate, decreased shortness of breath, and improved breathing patterns. Compared to other non-pharmacological interventions—such as bubble blowing, general breathing exercises, chest physiotherapy, pursed-lip breathing, and incentive spirometry—balloon-blowing therapy offers several advantages. It is simple, inexpensive, easy for nurses or family members to administer, and requires no complex equipment; furthermore, it is more engaging for children because it incorporates play. These factors are expected to boost the child's participation during the exercises, thereby optimizing therapeutic outcomes.

Within the framework of atraumatic care, balloon blowing therapy offers both physiological and psychological benefits. The play activity involved in blowing balloons can alleviate anxiety, reduce stress associated with hospitalization, foster cooperation during nursing procedures, and create a more pleasant care experience. Consequently, this intervention has the potential to enhance the effectiveness of breathing exercises while mitigating the negative impacts of hospitalization on children. Previous studies have demonstrated that balloon blowing therapy can help lower respiratory rates, improve lung expansion and oxygen saturation, and accelerate secretion clearance in patients with respiratory disorders. However, most of these studies focused on general pneumonia cases, asthma, or specific age groups. Research regarding the application of balloon blowing therapy for children with bronchopneumonia in Gorontalo Province—specifically at Prof. Dr. H. Aloei Saboe Regional General Hospital (RSUD) in Gorontalo City—remains very limited. This situation constitutes the research gap that necessitates the current

study. Furthermore, the use of balloon blowing therapy as a component of atraumatic nursing interventions for children with bronchopneumonia represents the study's element of novelty.

Based on the foregoing, this study was conducted to determine the effect of balloon-blowing therapy on improving respiratory function in children with bronchopneumonia at Prof. Dr. H. Aloei Saboe Regional General Hospital, Gorontalo City. The study findings are expected to serve as a basis for developing evidence-based nursing interventions to improve respiratory function in children with bronchopneumonia.

2. METHOD

This study employs a case study design with a descriptive approach, aiming to describe the application of nursing care for a pediatric patient with bronchopneumonia through airway management combined with balloon-blowing therapy as a non-pharmacological nursing intervention. The study subject was M.A.E., a 6-year-old child diagnosed with bronchopneumonia who was treated in the Pediatric Ward of Prof. Dr. H. Aloei Saboe Regional General Hospital (RSUD) in Gorontalo City. The nursing care focused on addressing ineffective airway clearance, characterized by shortness of breath, increased respiratory rate (tachypnea), difficulty expectorating sputum, and the presence of adventitious breath sounds (rhonchi). The patient's initial condition indicated impaired respiratory function, necessitating nursing interventions to improve ventilation and the mobilization of secretions. Inclusion criteria for this case study comprised pediatric patients diagnosed with bronchopneumonia who exhibited respiratory impairment (specifically increased respiratory rate and difficulty expectorating secretions), were conscious and cooperative, and had obtained parental or guardian consent to participate in the intervention. Exclusion criteria included patients in critical condition requiring mechanical ventilation, those with altered levels of consciousness, those with congenital respiratory system abnormalities, or those unable to follow instructions during the therapy.

Balloon-blowing therapy was administered as part of airway management over a 72-hour period (3×24 hours), with a frequency of once daily and a duration of 10–15 minutes per session. A standard-sized latex balloon served as the exercise medium. Prior to the procedure, the patient was placed in a semi-Fowler position to maximize lung expansion. The therapy was conducted according to standard operating procedures (SOP), involving an explanation of the procedure to the child and family and a demonstration of the balloon-blowing technique; the patient was then instructed to inhale slowly through the nose and exhale through the mouth into the balloon until it inflated. The exercises were performed gradually, taking the patient's tolerance into account and incorporating rest periods if the child appeared fatigued. Following the procedure, the patient was re-evaluated to assess their response to the intervention. Respiratory function parameters evaluated included respiratory rate (RR), level of dyspnea, ability to expectorate sputum, and the presence of adventitious breath sounds (rhonchi) via auscultation. Evaluations were conducted daily—both before and after the administration of balloon-blowing therapy—throughout the intervention period to monitor changes in the patient's clinical condition. Data collection involved nursing assessments, direct observation, physical examinations, a review of medical records, and daily evaluation of the patient's progress. The collected data were analyzed descriptively by comparing the patient's condition before and after the balloon-blowing therapy sessions over the three-day intervention period; findings were then interpreted based on changes in respiratory function indicators resulting from the implemented nursing care.

3. RESULT AND DISCUSSION

Result

Case study results indicate that administering balloon-blowing therapy as part of airway management interventions over a 72-hour period (3×24 hours) yielded positive changes in the respiratory function of a pediatric patient with bronchopneumonia. Improvements in the patient's respiratory status were evidenced by a gradual decrease in respiratory rate; the rate dropped from 39 breaths per minute on the first day to 27 breaths per minute by the third day. In addition

to the reduced respiratory rate, the patient exhibited clinical improvements, including diminished shortness of breath, easier sputum expectoration, and a reduction in adventitious breath sounds (specifically, rhonchi).

These changes indicate an improvement in the patient's respiratory condition during the intervention. Airway clearance improved, evidenced by easier sputum expectoration and reduced rhonchi. A decrease in respiratory rate and a reduction in shortness of breath also demonstrate improved ventilatory function following the administration of balloon blowing therapy as a non-pharmacological adjunct treatment. The balloon blowing therapy was administered routinely over three days alongside the patient's prescribed medical regimen. Throughout the intervention, the patient was able to participate in the exercises using a play-based approach, ensuring the therapy was conducted effectively.

Discussion

Bronchopneumonia is a condition characterized by inflammation of the bronchioles and alveoli, which can lead to mucosal edema, increased secretion production, and lung tissue consolidation. This condition can cause airway narrowing, reduced lung compliance, ventilation-perfusion mismatch, and impaired gas exchange. To compensate for these disturbances, the body increases its respiratory rate to meet oxygen demands. If this persists, the increased workload on respiratory muscles can lead to tachypnea, shortness of breath, and difficulty clearing secretions.

The case study results indicate a decrease in respiratory rate from 39 breaths/minute on the first day to 27 breaths/minute on the third day following the administration of balloon-blowing therapy. This reduction suggests an improvement in the patient's ventilation and respiratory function. Balloon-blowing therapy involves blowing up a balloon, prompting the child to perform active and controlled exhalation. This activity helps enhance the effectiveness of exhalation and supports lung expansion. Physiologically, the balloon-blowing exercise generates positive pressure during exhalation, which helps maintain the patency of the airways and alveoli. These conditions potentially help prevent alveolar collapse, promote lung expansion, and optimize alveolar ventilation. Repetitive breathing exercises can also condition the respiratory muscles, thereby making the processes of inhalation and exhalation more effective.

In addition to influencing ventilation, balloon-blowing therapy can also aid in the mobilization of secretions. The airflow generated during expiration helps move secretions from smaller airways toward larger ones, making them easier to expel through effective coughing. This aligns with case study findings showing that patients could expel sputum more easily and that adventitious breath sounds—specifically rhonchi—decreased. A reduction in rhonchi indicates a decrease in airway secretions, thereby improving airway clearance. This improvement is also accompanied by a reduction in shortness of breath. This outcome can be attributed to increased ventilatory efficiency following the breathing exercises. As ventilation becomes more effective, the work of breathing decreases, eliminating the need for the patient to maintain a high respiratory rate as a compensatory mechanism for ventilatory impairment.

The results of this case study align with research by Asih, Hidayat, and Triana (2022), which reported that balloon blowing therapy can help increase lung expansion, strengthen respiratory muscles, and improve ventilation, thereby reducing shortness of breath. A study by Handayani et al. (2024) also demonstrated that balloon blowing exercises can help lower respiratory rate by enhancing expiratory flow and the effectiveness of pulmonary ventilation. Meanwhile, Suharno et al. (2020) explained that breathing exercises using the balloon blowing technique can help improve oxygen transport, prolong the expiratory phase, and optimize carbon dioxide elimination, leading to improved respiratory function. The consistency between these case study results and previous research indicates that balloon blowing therapy has potential as an adjunct intervention for improving respiratory function in children with respiratory disorders. The reduction in respiratory rate and shortness of breath, along with easier sputum expectoration and diminished rhonchi, demonstrate positive changes in the patient's ventilation and airway clearance.

The improvement in the patient's condition was likely influenced not only by balloon-blowing therapy but also by several other factors. Given the patient's pediatric age, the exercises

could be conducted using a play-based approach, thereby enhancing the patient's interest and cooperation during therapy. Family support also facilitated optimal adherence to the exercise regimen. Furthermore, the balloon-blowing therapy was administered alongside pharmacological treatment as prescribed by the medical plan. Consequently, the observed clinical changes likely resulted from a combination of medical therapy and non-pharmacological nursing interventions. Performing the exercises routinely over a three-day period also allowed the patient to adapt to the breathing exercises. Repetition helped the patient execute exhalation in a more controlled and effective manner. Thus, these exercises have the potential to support improved ventilation efficiency and the mobilization of secretions.

In nursing practice, balloon-blowing therapy serves as a relatively simple, easy-to-administer, and low-tech complementary intervention. Using balloons for exercises aligns with the principles of atraumatic care, as the activity can be framed as play, making it more engaging for children. This approach helps enhance the child's comfort and cooperation during treatment. Although positive clinical changes were observed, this case study is limited by its single-patient scope, meaning the findings cannot be generalized to all pediatric patients with bronchopneumonia. Furthermore, the patient received pharmacological therapy as part of the medical regimen during the treatment period; consequently, the impact of balloon-blowing therapy on the patient's recovery cannot be entirely disentangled from the effects of the concurrent medical treatment.

Future studies could also evaluate respiratory function more comprehensively by incorporating parameters such as oxygen saturation, chest wall retractions, use of accessory respiratory muscles, and chest expansion. Including these parameters would provide a more complete picture of changes in respiratory function following the administration of balloon-blowing therapy. Based on the case study results, physiological mechanisms, and prior research, balloon-blowing therapy has the potential to improve respiratory function in children with bronchopneumonia by enhancing ventilation efficiency, supporting lung expansion, facilitating secretion mobilization, and reducing respiratory rate. However, studies with larger sample sizes and more robust designs are needed to objectively confirm the effectiveness of balloon-blowing therapy.

4. CONCLUSION

Based on the case study results, the administration of balloon blowing therapy as an adjunct non-pharmacological nursing intervention for a child with bronchopneumonia demonstrated an improvement in respiratory function. This improvement was evidenced by a gradual decrease in respiratory rate (RR) from 39 breaths/minute to 27 breaths/minute, accompanied by reduced shortness of breath, improved airway clearance through more effective secretion expectoration, and a reduction in adventitious breath sounds (rhonchi). These findings indicate that balloon blowing therapy has the potential to help improve respiratory function in the pediatric patient with bronchopneumonia described in this case study.

In terms of practical implications, balloon-blowing therapy can be considered an easy-to-administer, safe, and complementary non-pharmacological nursing intervention that supports the implementation of atraumatic care for pediatric patients with bronchopneumonia. However, as these findings are based on a single case report, further research with larger sample sizes and more robust study designs is required to confirm the benefits of the intervention.

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