



APPLICATION OF BALLOON BLOWING FOR RESPIRATORY FREQUENCY IN CHILDREN AGED 6-14 YEARS WITH BRONCHOPNEUMONIA

Nur Asa Rhahmadani Susanti, Irdawati*

Nursing Professional Program, Faculty of Health Sciences, Universitas Muhammadiyah Surakarta. Jl. Ahmad Yani, Pabelan, Kartasura, Sukoharjo, Central Java 57169, Indonesia

*irdawati@ums.ac.id

ABSTRACT

Bronchopneumonia in children can cause impaired gas exchange characterized by increased respiratory rate and decreased oxygen saturation. Non-pharmacological interventions, such as balloon blowing, are considered effective for increasing lung expansion and strengthening respiratory muscles. This study aimed to determine the effectiveness of balloon blowing techniques on respiratory rate and oxygen saturation in children aged 6–14 years with bronchopneumonia. This study uses a case study method with a descriptive nursing care approach, implementing Evidence-Based Nursing, to determine the impact of the Balloon Blowing technique intervention on children aged 6-14 years with a diagnosis of Bronchopneumonia. The sampling technique used is purposive sampling, namely, children aged 6-14 years with a diagnosis of Bronchopneumonia at a hospital in Central Java. The intervention lasted 20 minutes in a single session, using deep breathing techniques combined with balloon blowing. Data collection was conducted through a nursing assessment process that included interviews with parents and children regarding the patient's complaints, observation of the patient's condition, measurement of respiratory rate (RR), measurement of oxygen saturation (SpO₂) using an oximeter, and lung auscultation using a stethoscope to detect additional breath sounds. Measurements were conducted twice, namely before and after the intervention. The data obtained were analyzed descriptively by comparing changes in respiratory rate (RR), oxygen saturation (SpO₂), and the patient's subjective response before and after the intervention to determine the effectiveness of the Balloon Blowing technique in improving respiratory function in children with bronchopneumonia. The results showed that all patients experienced a decrease in respiratory rate from tachypnea to the normal range (from an average of 30.8 to 24.2 breaths/min) and an increase in oxygen saturation (from an average of 95.6% to 98%). In addition, patients reported subjective improvements, including reduced shortness of breath and increased comfort. The balloon blowing technique is a simple, safe, and effective non-pharmacological surgical intervention to improve respiratory function in children with bronchopneumonia.

Keywords: balloon blowing; bronchopneumonia; children; oxygen saturation; respiratory rate

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INTRODUCTION

Bronchopneumonia is an infection that affects the airways leading to the lungs, specifically the bronchi. The primary cause is bacterial infection, but it can also be caused by viruses and fungi. This disease is particularly life-threatening in children, older adults, and patients with other chronic health conditions that weaken the immune system. Bronchopneumonia is more common in infants and young children because their immune systems are not yet fully developed (Putri & Amalia, 2023). Children with bronchopneumonia may experience decreased lung function, impaired gas exchange, and increased risk of infection spread. Respiratory failure can occur in extreme cases (Terok et al., 2025).

Bronchopneumonia is classified as an airborne infectious disease, transmitted when someone with bronchopneumonia coughs or sneezes, spreading germs in droplets into the air. Coughing or difficulty breathing, including rapid breathing and lower chest wall indrawing, are indications of bronchopneumonia (Pertiwi et al., 2024). The WHO (2020) estimates that bronchopneumonia

causes between 820,823 and 2 million child deaths annually. Even more children under the age of five die from this disease than from any other infectious disease. According to the WHO, the average annual incidence of clinical bronchopneumonia in children worldwide is 0.28 events per 100,000 children. Approximately 150.7 million new cases are detected annually, when adjusted for the global population. Of these, 11-20 million cases (approximately 7–13%) are considered severe and require hospitalization to prevent more serious complications (WHO, 2020). Serious effects of bronchopneumonia in children include coughing, difficulty breathing, high fever, and acute respiratory distress. In children with weakened immune systems or underlying medical conditions, this condition often requires intensive medical care (Setiawati et al., 2024). Two important indicators for detecting respiratory disorders are oxygen saturation levels and respiratory rate (RR), both of which are included in the five parameters in the National Early Warning Score (NEWS). This indicates that the respiratory process plays a crucial role in the gas exchange system between the environment and the human body (Luthfianto & Irdawati, 2023). Normal oxygen saturation is between 95-100%. This oxygen saturation value is important to monitor because it can provide an overview of the process of oxygen delivery throughout the body (Direktorat Jenderal Kesehatan Lanjutan Search, 2022). The normal respiratory rate according to age is 35-40 breaths per minute for newborns, 30-50 breaths per minute for infants (6 months), 25-32 breaths per minute for toddlers (2 years), 20-30 breaths per minute for children, 16-19 breaths per minute for adolescents, and 12-20 breaths per minute for adults (Pratiwi et al., 2023).

Nurses can implement curative (healing) strategies through non-pharmacological interventions that can reduce respiratory problems, one of which is nursing interventions that can be given to those experiencing respiratory problems based on research on the application of balloon therapy which can improve oxygenation status in children with respiratory disorders and can be used as a traumatic care approach in children due to the effects of hospitalization (Hartati & Sari, 2023). Research shows that breathing exercises help strengthen children's lungs and manage respiratory problems by reducing the severity of respiratory symptoms and signs. Because some toddlers and adults may still refuse to cooperate, modified breathing exercises are necessary (Tiwari et al., 2024). The balloon blowing technique is a relaxation technique that can help the intracosta muscles evaluate the diaphragm and costal muscles, thus allowing them to absorb oxygen, change oxygen in the lungs, and expel carbon dioxide in the lungs. The balloon blowing technique is very effective in helping lung expansion, thereby being able to supply oxygen and remove carbon dioxide trapped in the patient's lungs. Balloon blowing exercises are useful for preventing shortness of breath and oxygen deficiency. Oxygen intake provides energy for cells and muscles by expelling carbon dioxide. The therapeutic effect of balloon blowing play activities on changes in lung function before and after balloon blowing therapy. Balloon blowing therapy can increase the strength of the patient's respiratory muscles, maximizing lung recoil and compliance, thus improving lung function (Asih et al., 2022).

The activity of blowing up balloons can help prevent dyspnea and reduce the body's oxygen levels. In addition to removing carbon dioxide, the activity of blowing up balloons provides energy to the body's muscles and cells. Changes in lung function before and after intervention are influenced by the use of balloons for therapy (Nadira & Novikasari, 2025). This method can increase airflow during expiration, increase alveolar pressure in each lung lobe, and stimulate cilia in the respiratory mucosa to clear the airways of secretions (Pramesti et al., 2024). The use of this technique can also help increase the amount of air entering the lungs and reduce the amount of energy used during breathing (Kartikasari & Nurlaela, 2023).

The results of the study by Raja & Arunachalam (2022) showed a significant difference in changes in respiratory frequency in 20 children aged 3-6 years with balloon therapy, with a significant p-value <0.05, which was seen from the respiratory frequency before and after therapy (Raja et al., 2022). In addition, the results of the study by James & S (2023) showed that balloon blowing

exercises were effective in improving respiratory parameters, and in addition to accelerating recovery, these exercises were feasible and cost-effective (James & S, 2023). Based on the severity of complications and the importance of the role of nurses in children with bronchopneumonia, the purpose of this case study is to explain the results of the application of the Balloon Blowing Technique (blowing balloons) in pediatric patients with bronchopneumonia and evaluate the patient's response to the intervention. The purpose of this intervention is to provide simple and non-pharmacological nursing therapy that can help improve respiratory function and support oxygenation in pediatric patients experiencing respiratory problems.

METHOD

This study uses a case study method with a descriptive nursing care approach, implementing Evidence-Based Nursing, to determine the impact of the the Balloon Blowing technique intervention on children aged 6-14 years with a diagnosis of Bronchopneumonia. The sampling technique used is purposive sampling, namely, children aged 6-14 years with a diagnosis of Bronchopneumonia. Balloon blowing intervention is carried out for 20 minutes in one day. The Case Study was implemented in one of the children's wards of a hospital in Central Java. The intervention was carried out on 5 children with the inclusion criteria of children aged 6-14 years, experiencing coughing, shortness of breath, and diagnosed with bronchopneumonia. The exclusion criteria are patients who must rest, who are not allowed to undergo this intervention, and patients who are not willing to be given the intervention. Data collection was conducted through a nursing assessment process that included interviews with parents and children regarding the patient's complaints, observation of the patient's condition, measurement of respiratory rate (RR), measurement of oxygen saturation (SpO₂) using an oximeter, and lung auscultation using a stethoscope to detect additional breath sounds. Measurements were conducted twice, namely before and after the intervention. Before the intervention, the patient was given instructions to perform a deep breathing technique to be applied when blowing a balloon. The patient was taught to perform a deep breathing technique by counting 3 seconds to inhale, 3 seconds to hold the breath, and 3 seconds to exhale. When exhaling, the patient was asked to exhale into a prepared balloon. After the patient was able to perform the deep breathing technique correctly, the patient was given a balloon blowing intervention. The data obtained were analyzed descriptively by comparing changes in respiratory rate (RR), oxygen saturation (SpO₂), and the patient's subjective response before and after the intervention to determine the effectiveness of the Balloon Blowing technique in improving respiratory function in children with bronchopneumonia.

RESULT

Table 1.
Respondent Characteristics by Age and Gender

Name	Age	Gender
An. Ab	10 years old	Male
An. R	7 years old	Male
An.Z	8 years old	Male
An. R	14 years old	Male
An. R	6 years old	Male

Table 1. Shows the distribution of respondents by age and gender. Of the five children who responded, all were male (100%). The ages ranged from 6, 7, 8, 10, and 14 year.

Table 2.
Before Intervention

Name and Age	Visiting Schedule	Procedure Time	Patient Response	Respiration rate	Oxygen Saturation
An. Ab 10 Years old	Friday, June 20, 2025	13.00	S : The patient's mother said the child had a cough and shortness of breath last night.	32x/ minute	95%

Name and Age	Visiting Schedule	Procedure Time	Patient Response	Respiration rate	Oxygen Saturation
			O : - patients often cough and breathe rapidly - there are additional breath sounds and rhonchi		
An. R 7 Years old	Friday, June 20, 2025	13.45	S : The patient's mother said that the patient had a cough without phlegm, the phlegm was difficult to get out and the cough O : - The patient coughed repeatedly - Phlegm cannot be expelled - No additional breath sounds	34x/minute	96%
An.Z 8 Years Old	Tuesday, June 24, 2025	12.00	S : The patient's mother said that her child had been coughing for 3 days, the cough was still accompanied by phlegm but the patient had difficulty expelling it and had a runny nose. O : - The patient appears to be coughing - Cold patient - No additional breath sounds	32x/minute	96%
An. R 14 years old	Thursday, June 26, 2025	19.00	S : The patient's father said that his son was brought in yesterday because he was coughing after having a barbecue with his friends, and he couldn't sleep because he felt short of breath. O : - The patient has a cough and phlegm - No additional breath sounds	25x/minute	95%
An. R 6 Years Old	Thursday, June 26, 2025	20.00	S : The patient's mother said that sometimes the patient coughs and the cough is dry/does not produce phlegm. O : - The patient coughs and no phlegm comes out. - No additional breath sounds	31x/minute	96%

Table 2. Before intervention. Shows the condition of pediatric patients before intervention. All children showed an increase in RR above the normal limit of 20-30x/minute and showed a decrease in Spo2 below the normal limit of 95-100%.

Table 3.
After Intervention

Name and Age	Visiting Schedule	Procedure Time	Patient Response	Respiration rate	Oxygen Saturation
An. Ab 10 Years Old	Friday, June 20, 2025	13.00	S : The patient said that after blowing up the balloon, his breathing felt lighter. O : - The patient's breathing is no longer as rapid as before the procedure. - decreased breath sounds with additional rhonchi	26x/ minute	98%
An. R 7 years old	Friday, June 20, 2025	13.45	S : The patient said that when he blew up the balloon, his breathing became better. O : - The patient's breathing is no longer rapid - No additional breath sounds	23x/ minute	99%
An.Z 8 years old	Tuesday, June 24, 2025	12.00	S : The patient said that he enjoyed being able to blow up the balloon, and that when he blew up the balloon, he did not feel short of breath. O : - Patients can follow instructions during the intervention. - The patient is no longer breathing rapidly - No additional breath sounds	25x/ minute	98%
An. R 14 years old	Thursday, June 26, 2025	19.00	S : The patient said that his breathing was no longer short and he felt comfortable. O : - The patient's breathing is no longer rapid - No additional breath sounds	20x/ minute	97%
An. R 6 years old	Thursday, June 26, 2025	20.00	S : The patient said that when he blew up the balloon, his breathing felt comfortable. O : - The patient's breathing does not appear rapid. - No additional breath sounds	27x/ minute	98%

Table 3. After intervention. Shows the condition of pediatric patients after intervention. All children showed improvement in RR to within the normal range of 20-30x/minute and showed that Spo₂, which had previously decreased below the normal range of 95-100%, improved to within the normal range.

DISCUSSION

Bronchopneumonia in children impairs gas exchange due to inflammation of the bronchioles and alveoli, leading to increased respiratory rate (tachypnea) and decreased oxygen saturation. The results of a case study on 5 children aged 6–14 years showed that before the intervention, all respondents experienced an increase in Respiratory Rate (RR) above the normal age limit (20–30x/minute), with the highest RR of 34x/minute (An. R, 7 years old) and oxygen saturation ranging from 95–96%. After a 20-minute balloon blowing intervention, RR decreased in all patients to the normal range of 20–27x/minute, and oxygen saturation increased to 97–99%. This decrease indicates that the intervention has helped relieve the respiratory burden in children.

Balloon therapy is a simple exercise that increases lung capacity by a certain amount every day (Budhi et al., 2024). Balloon blowing exercises are useful for preventing shortness of breath and weakening the oxygen entering the body to provide energy for cells and muscles by expelling carbon dioxide (Sholekah et al., 2023). This therapy focuses more on reducing the child's respiratory rate. This therapy focuses more on reducing the child's respiratory rate. The strong inhalation and long, powerful exhalation produced by Balloon blowing strengthen the intra-abdominal muscles, which, in turn, shrink the chest cavity (Oktaria et al., 2026).

The results of the case study are in line with research by Hartati & Sari (2023), which showed that balloon blowing therapy improved breathing patterns in pediatric patients by reducing the respiratory rate to a slow, regular rate (Hartati & Sari, 2023). Research by Widyowati & Irdawati (2025) found that blowing balloons with Pursed lip breathing had a significant effect on RR and SpO₂ in children with respiratory disorders (Widyowati & Irdawati, 2025). This is also supported by research by Pakuku et al. (2024), which found that measurements of shortness of breath in patients showed a very significant decrease in respiratory frequency, SpO₂, and the intensity of shortness of breath (Pakuku et al., 2024). These results are in line with research by Asih et al. (2022), which stated that the balloon blowing technique can evaluate the diaphragm and costal muscles, increase lung expansion, and help expel trapped carbon dioxide (Asih et al., 2022). Nadira & Novikasari (2025) also reported that balloon-blowing activity energizes cells and muscles and prevents dyspnea (Nadira & Novikasari, 2025). In this study, patients also reported subjective sensations such as “breathing feels lighter,” “less tight,” and “comfortable” after the intervention, indicating improved respiratory comfort.

However, in one patient (An. Ab, 10 years old), additional breath sounds (ronchi) were still found even though they had decreased. However, this is in line with the research of Fitria et al. (2025), which found that effective coughing increased, respiratory rate decreased to 28 x/minute, breathing pattern improved, and additional breath sounds (ronchi) decreased. It can be assumed that the rhonchi heard during lung auscultation examination are caused by the accumulation of secretions. The mucus that appears is an immune response when viruses and bacteria attack the lungs (Fitria et al., 2025). This indicates that balloon blowing is more effective in improving respiratory mechanics and oxygenation, but does not completely replace pharmacological therapy such as bronchodilators in patients with significant bronchospasm. A limitation of this study is that the intervention was only carried out once a day, so it is not possible to assess the long-term effects or accumulation of repeated breathing exercises. Overall, the balloon blowing technique is easy, inexpensive, and safe to perform as a complementary non-pharmacological therapy to improve respiratory function in children with bronchopneumonia, especially in an inpatient setting.

CONCLUSION

Based on the results of a case study on five children aged 6–14 years with bronchopneumonia, it can be concluded that administering a 20-minute balloon blowing technique intervention is effective in improving respiratory function. This is demonstrated by a decrease in respiratory rate (RR) from tachypnea to the normal range and an increase in oxygen saturation in all respondents after the intervention. In addition to improvements in objective parameters, subjective patient responses also showed positive outcomes, including reduced shortness of breath, easier breathing, and increased comfort after therapy. Although residual symptoms such as increased breath sounds were still observed in some cases, overall, this intervention improved respiratory mechanics and oxygenation. Thus, the balloon blowing technique can be recommended as a simple, safe, and effective non-pharmacological nursing intervention as a supportive therapy in the management of children with bronchopneumonia. However, this intervention still needs to be combined with other medical therapies and carried out continuously to achieve optimal results.

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