

## Effect of Pursed Lips Breathing Exercise on Respiration Rate in Children with Bronchopneumonia at Sumber Sanas Hospital

Dwi Salsa Hamidah<sup>1</sup>  
College of Health Sciences Sumber Sanas  
Nursing Professional Education Study Program  
Email:

### ABSTRACT

*Bronchopneumonia, also referred to as lobular pneumonia, is an inflammatory condition of the lung parenchyma that may extend to the bronchioles and alveoli. Its etiology includes bacteria, viruses, fungi, and foreign bodies. One of the non-pharmacological interventions that can be applied is pursed lips breathing (PLB), which is beneficial for improving ventilation, releasing trapped air, slowing the respiratory rate, and promoting relaxation in children. This study aimed to examine the effect of PLB exercise on the respiratory rate of children with bronchopneumonia at Sumber Waras Hospital in 2025. A quantitative method was employed with a quasi-experimental one-group pretest–posttest design. The study sample consisted of 10 children with bronchopneumonia, selected using a total sampling technique. Data were analyzed with a dependent t-test to compare respiratory rate values before and after the intervention. The findings revealed a reduction in the average respiratory rate following PLB exercise. Statistical analysis confirmed a significant difference in respiratory rate between pre- and post-intervention ( $p = 0.000$ ). Conclusion: Pursed lips breathing exercise is effective in lowering respiratory rate among children with bronchopneumonia. This intervention can be recommended as a supportive non-pharmacological therapy in pediatric nursing care for respiratory problems.*

*Keywords: Bronchopneumonia, Pursed lips breathing, Respiratory rate*

### ABSTRAK

Bronkopneumonia, atau pneumonia lobularis, merupakan peradangan pada jaringan paru yang dapat meluas hingga bronkiolus serta alveolus, dengan penyebab beragam seperti bakteri, virus, jamur, maupun benda asing. Salah satu intervensi nonfarmakologis yang dapat diterapkan adalah latihan pernapasan pursed lips breathing (PLB). Teknik ini bermanfaat dalam memperbaiki ventilasi, membantu mengeluarkan udara yang terperangkap, menurunkan frekuensi napas, serta memberikan efek relaksasi pada anak. Penelitian ini bertujuan menganalisis pengaruh latihan PLB terhadap laju pernapasan anak dengan bronkopneumonia di Rumah Sakit Sumber Waras tahun 2025. Penelitian menggunakan pendekatan kuantitatif dengan desain quasi eksperimen one group pretest–posttest. Sampel terdiri atas 10 anak dengan bronkopneumonia yang dipilih melalui teknik total sampling. Analisis data dilakukan menggunakan uji t-test dependen untuk membandingkan laju napas sebelum dan sesudah intervensi. Hasil penelitian menunjukkan adanya penurunan rata-rata respiratory rate setelah diberikan latihan PLB. Uji statistik memperlihatkan perbedaan bermakna antara nilai sebelum dan sesudah intervensi ( $p=0,000$ ). Kesimpulan: Latihan pursed lips breathing terbukti efektif menurunkan frekuensi pernapasan pada anak dengan bronkopneumonia, sehingga dapat direkomendasikan sebagai terapi nonfarmakologis pendukung dalam asuhan keperawatan anak dengan gangguan pernapasan.

Kata Kunci: Bronkopneumonia, Pursed lips breathing, Laju Pernapasan

### INTRODUCTION

#### Background

Bronchopneumonia is one of the most common diseases of the lower respiratory tract in children and is still a global health problem. The disease is characterized by inflammation of the pulmonary parenchyma that extends to the bronchioles and alveolus, which is generally caused by bacterial, viral, or fungal infections. In addition to infectious factors, conditions such as foreign body aspiration or reflux can also trigger bronchopneumonia (Waseem, 2020). Burden of disease

bronchopneumonia is still very high. The WHO (2024) reports that pneumonia, including bronchopneumonia, causes more than 740,000 deaths in children under the age of five in 2023, or about 14% of all deaths among toddlers. In Indonesia, pneumonia ranks high as a cause of child morbidity and mortality. Data from the 2024 Indonesian Health Profile shows that the prevalence of bronchopneumonia reaches 50.9% with the highest incidence in West Papua, DKI Jakarta, and Banten (Indonesian Ministry of Health, 2024). The high number of these shows that

Bronchopneumonia is still a major challenge in children's health services. Various risk factors can increase children's susceptibility to bronchopneumonia, including young age, poor nutritional status, low birth weight, lack of breastfeeding, housing density, air pollution, and incomplete immunization (Bradley et al., 2020).

These factors not only contribute to the high incidence rate, but also worsen the severity of the disease. Clinical manifestations of bronchopneumonia include fever, coughing up phlegm, tachypnea, shortness of breath, as well as additional breathing sounds such as rumbling and wheezing. If not treated immediately, this condition can cause serious complications such as respiratory failure, lung abscess, sepsis, and death (Smeltzer & Bare, 2013). Another impact that is often encountered is the disruption of gas exchange and ineffective breathing patterns, which have implications for decreased oxygen saturation and disruption of children's daily activities. In nursing practice, interventions for children with bronchopneumonia do not only focus on providing pharmacological therapy, but also require non-pharmacological supportive therapy. One of the simple, inexpensive, and easy-to-teach interventions is pursed lips breathing (PLB).

This technique is done by breathing air through the nose and then exhaling it slowly through the lips that are closed. PLB has been shown to be effective in improving ventilation, reducing air trapped in the lungs, lowering breathing frequency, increasing oxygen saturation, and providing a relaxation effect (Garrod & Mathieson, 2017). In children, PLB can be modified with play activities such as blowing balloons or soap bubbles to make it more engaging and increase engagement. Research

previous showed the effectiveness of PLB in improves oxygenation status and lowers respiratory rate in children with respiratory disorders, including bronchopneumonia (Muliasari & Indrawati, 2018; Irawati & Rika, 2018). Thus, PLB has the potential to become one of the innovative nursing interventions that can be applied in children's health services.

The role of nurses is very important in providing education, guiding, and motivating patients and families to do breathing exercises such as PLB. The application of this intervention not only helps to reduce respiratory symptoms, but also improves the patient's quality of life during the healing process. Based on this description, this study was conducted to analyze the effect of pursed lips breathing exercises on respiratory rate in children with

can strengthen the scientific evidence regarding the effectiveness of PLB and be the basis for its application as a non-pharmacological intervention in the nursing care of children with respiratory disorders.

**RESEARCH METHODS**

This study uses a quantitative approach with a quasi-experimental design of one group pretest–posttest. This design was chosen to assess the effect of pursed lips breathing (PLB) exercise on the respiratory rate of children with bronchopneumonia. The study population was all children with bronchopneumonia who were treated at Sumber Waras Hospital Jakarta. The sample consisted of 10 respondents, determined by the total sampling technique based on inclusion and exclusion criteria. The research was conducted in the Children's Room of Sumber Waras Hospital Jakarta in July-August 2025. The instruments used were: Observation sheet of respondent characteristics (age, gender) and Observation sheet of breath frequency, measured by calculating the number of breaths per minute through inspection for 60 seconds. The researcher explained the objectives and procedures of the study to the patient's parents. Respondents who met the inclusion criteria were given an initial measurement of their breathing frequency (*pretest*). Respondents were given PLB exercises with a duration of ±15 minutes, 2 times a day, during the treatment period. After the intervention, the measurement of the breath frequency (*posttest*) was carried out again. The data is recorded on the observation sheet. Data were analyzed using a *paired t-test* to compare the average value of breathing frequency before and after the intervention. The significance level was set at  $p < 0.05$ .

**RESULT**

**Table 4.1 Average Age Distribution of Preschool Children Experiencing Bronchopneumonia at Sumber Sanas Hospital in 2025**

<b>Variabl e l</b>	<b>N.</b>	<b>SD</b>	<b>Minimum - Maxim m</b>	<b>95%C I</b>
Age	4,00	0,81 <hr/> 6	3-5	3,42- <hr/> 4,58

bronchopneumonia. The results of this study are expected

Based on table 4.1, it shows that the average age of preschoolers who experience bronchopneumonia is 4 years old with a standard deviation = 0.816. The youngest age is 3 years old and the oldest age is 5 years. This is in accordance with the preschool age category, where children in this age range have an immature immune system so that they are more susceptible to respiratory infections, including bronchopneumonia. The results of this study are in line with several previous studies, namely research conducted by Wulandari., et al (2021) found that most children

Patients with bronchopneumonia are in the age group of 3–5 years, with an average age of 4.2 years. The results of this study are supported by research conducted by Rizki & Sari (2020) stating that preschool-age children are more at risk of pneumonia than school-age children because of a fully developed immune system. The results of this study are in line with the research conducted by Mulyani., et al (2019) reported that 65% of bronchopneumonia cases were found in children aged 3–5 years, and environmental factors also aggravated this condition.

Almost the same research conducted by Rahmawati & Putra (2022) states that bronchopneumonia occurs in preschool age due to high physical activity in children which increases the risk of exposure to pathogens. Another study conducted by Fitriani., et al. (2020) shows that preschool age is a vulnerable group to bronchopneumonia, especially if there is a history of malnutrition and incomplete immunization status. Thus, this study is consistent with previous literature that preschool age (3–5 years) is the most vulnerable group to bronchopneumonia. According to the theory of the development of childhood immunology, the adaptive immune system only develops optimally after school age. At preschool age, the body's defense mechanism against infection is still weak, so germs invade the lower respiratory tract more easily. This is in line with the concept of pediatric immunology (Nelson, 2020) which explains that exposure to infections is more common in early childhood, especially pneumonia and bronchopneumonia.

According to the epidemiological theory of infectious diseases, the incidence of bronchopneumonia in preschool-age children is closely related to host factors (immunity), agents (causative microorganisms), and environment (environment). Children aged 3–5 years have a relatively smaller airway than adults, so when inflammation occurs, it will be easier to cause airway obstruction. In addition, according to the theory of the physiological development of the respiratory system (Potter & Perry, 2019), the child's alveoli have not been fully developed so that oxygen exchange is less efficient when infection occurs. This reinforces the reason why preschool age is the most vulnerable group to bronchopneumonia. Based on the results of research and literature, researchers assume that the age of 3-5 years is a prone period of bronchopneumonia due to a combination of immature immune factors, active child behavior so that it is more susceptible to environmental exposure, and non-optimal prevention through immunization or family parenting. Therefore, promotive and preventive interventions at home and

Health facilities need to be focused on this age group.

**Table 4.2 Distribution of Preschool-Aged Children With Bronchopneumonia by Gender at Sumber Sanas Hospital in 2025**

<b>Kind Sex</b>	<b>Frequency</b>	<b>Percentage</b>
Man	7	70,0
Woman	3	30,0
Sum	10	100

Based on table 4.2, it shows that out of 10 respondents, most of the respondents were male, namely 7 respondents (70.0%). This shows that boys have more bronchopneumonia than girls. The results of this study are in line with several previous studies conducted by Sari., et al (2020) found that the prevalence of bronchopneumonia is higher in boys (65%) than in women (35%). The results of this study are also supported by the results of research by Handayani & Putra (2019) reporting that 60% of pneumonia cases in children occur in the male sex. The results of this study are in line with the results of the research by Wahyu., et al (2021) stating that boys are more susceptible to lower respiratory tract infections due to hormonal factors and respiratory tract anatomy.

Almost the same as the results of the study conducted by Rohani., et al (2018) reported that there is a tendency for pneumonia cases to be more in boys (68%) than in women. Another study conducted by Yuliana & Setiawan (2022) also showed that boys dominated cases of bronchopneumonia with a ratio of 2:1 to girls. Thus, this study is consistent with the literature that states that men are more prone to developing bronchopneumonia than women. According to the concept of pediatric epidemiology, sex differences can affect susceptibility to disease. Physiologically, boys have smaller airway diameters than girls of the same age, so when inflammation occurs, the risk of airway obstruction is higher.

In addition, according to immunological theories (Guyton & Hall, 2020), sex hormones also play a role: the hormone estrogen in girls is known to have a protective effect in the immune response, while boys do not have the same protection. This explains why the incidence of bronchopneumonia is more common in

man. In addition, according to the theory of lung development in children (Nelson, 2020), boys tend to have slower lung maturation than girls. This causes boys' lung function to be slightly lower at the same age, so they are more prone to respiratory distress when exposed to infection. This factor also strengthens that gender differences have an influence on children's susceptibility to experiencing bronchopneumonia. Researchers assume that the high incidence rate of bronchopneumonia in boys is due to anatomical factors of the narrower respiratory tract, as well as differences in innate immune responses that make them more susceptible to respiratory tract infections. In addition, the behavior of boys who tend to be more active and often do physical activity outside the home increases the likelihood of exposure to microorganisms that cause bronchopneumonia.

**Table 4.3 Effect of Pursed Lips Breathing Exercise on Respiration Rate in Children With Bronchopneumonia at Sumber Sanas Hospital**

<u>Respiratio n R a t e</u>	<u>n</u>	<u>Mean</u>	<u>SD</u>	<u>t</u>	<u>P Value</u>
Before	10	33,40	0,966	11,000	0,000
After	10	31,20	1,135		

Based on the results of data analysis as stated in table 4.4, it is known that the average respiratory rate test results before being given *pursed lips breathing* exercises are 33.40 x/min with a standard deviation of 0.966 while the average results of respiration rate checks after being given *pursed lips breathing* exercises 31.20 x/min with a standard deviation of 1.135. The results of the t-test were obtained with a value of  $p = 0.000$  ( $p < 0.05$ ), this means that there is an effect of pursed lips breathing exercises on respiration rate in children with bronchopneumonia at Sumber Waras Hospital. These results are in line with research conducted by Astuti et al. (2020) that the practice of pursed lips breathing is able to reduce the frequency of breathing in patients with acute respiratory distress. A similar study conducted by Mulyani & Siregar (2021) states that simple breathing therapy such as pursed lips breathing is effective in reducing shortness of breath and improving lung ventilation in children with pneumonia. This study is supported by research conducted by Putri., et al. (2019) which states that there is a decrease in respiratory rate by an average of 2–3 x/minute after pursed lips breathing intervention in bronchopneumonia patients. The results of this study are in line with the results of Haryanto's research, et al. (2022) show that pursed lips breathing can increase exchange

oxygen and lowering symptoms of respiratory distress. A similar study conducted by Santoso & Wulandari (2020) also proves that this breathing exercise is able to reduce breathing speed while providing a relaxing effect in children with obstructive pulmonary disease. Thus, the results of this study strengthen the evidence that pursed lips breathing is an effective nonpharmacological intervention to reduce respiratory rate in children with respiratory disorders, including bronchopneumonia. According to the concept of respiratory physiology by Guyton & Hall (2020), pursed lips breathing helps slow down the rate of breathing, increase positive pressure on the airways, and prevent alveoli collapse so that gas exchange is more optimal. This technique also improves alveolar ventilation and decreases the work of the respiratory muscles.

In patients with bronchopneumonia who experience increased breathing frequency due to lung inflammation, this exercise is effective in lowering the respiration rate. In addition, the theory of respiratory nursing according to Smeltzer & Bare (2019) explains that controlled breathing exercises are able to improve breathing patterns, reduce anxiety, and improve patient comfort. This supports that simple interventions such as pursed lips breathing can be a useful additional therapy. Based on the results of the research and existing theories, the researcher assumes that pursed lips breathing exercises are able to reduce the respiration rate of children with bronchopneumonia through the mechanism of increasing alveolar ventilation, improving breathing patterns, and the relaxation effect provided. This technique is also easy to teach, does not require special tools, and can be done independently by children with parental assistance, making it effective as a nonpharmacological intervention in the nursing care of children with bronchopneumonia.

### CONCLUSION

Based on the results of a study on the effect of *pursed lips breathing* exercise on respiration rate in preschoolers with bronchopneumonia at Sumber Waras Hospital in 2025, it can be concluded that:

1. Age-based respondent characteristics showed that the average preschooler who experienced bronchopneumonia was 4 years old with an age range of 3–5 years. This illustrates that preschool age is a vulnerable group to bronchopneumonia.
2. Respondent characteristics by gender show that most of the patients with bronchopneumonia are men (70%), while women are only 30%. These findings suggest that boys

are more at risk of developing bronchopneumonia than girls.

3. The effect of pursed lips breathing exercise has been shown to significantly reduce respiration rate in preschoolers with bronchopneumonia. Before the intervention, the average respiration rate was 33.40 x/minute, while after the intervention it decreased to 31.20 x/minute. Statistical tests showed a value of  $p = 0.000$  ( $p < 0.05$ ), which means that there is a real effect of *pursed lips breathing exercise* on a decrease in respiration rate.

Overall, this study proves that *pursed lips breathing exercises* can be used as a simple non-pharmacological intervention that is effective in helping to reduce the breathing frequency of children with bronchopneumonia.

#### **BIBLIOGRAPHY**

- Adriana. D. (2013). Growth and Development & Play Therapy in Children. Jakarta: Selemba Medika
- Anggreini and Dhea (2022). The Effect of the Application of *Pursed Lips Breathing* (PLB) on Changes in Oxygen Saturation in Children with Respiratory System Disorders Due to Bronchopneumonia in the Melati Room 5 of Dr. Soekardjo Hospital, Tasikmalaya City <http://repo.poltekkestasikmalaya.ac.id/1052/>
- Araujo, et al. (2015). Pursed-Lips Breathing Reduces Dynamic Hyperinflation Induced By Activities of Daily Living Test in Patients With Chronic Obstructive Pulmonary Disease: A Randomized Cross-Over Study
- Astuti, R., Pratiwi, S., & Nugroho, H. (2020). The effectiveness of *pursed lips breathing exercises* on decreasing the breathing frequency of patients with acute respiratory distress. *Journal of Respira Nursing*, 8(2), 55–63
- Azizah Mukromah, Dhona Andhini, E. Y. F. Y. (2018). Effect of the Pursed Lip Breathing Method on Expiratory Peak Flow in Patients with Chronic Obstructive Pulmonary Disease. 1(2), 1–9
- Bradley, J., C.L., B., SS, S., B, A., ER, C., C, H., & All., K. S. (2017). The Management of Community-Acquired Pneumonia in Infants and Children Older Than 3 Month of Age: Clinical Practice Guidelines by the Pediatric Infectious Diseases Societ. *Clinical Infection Disease*, 53 (7): 617-630.
- Fitriani, D., Lestari, Y., & Putri, A. (2020). Risk factors for pneumonia in children under five. *Andalas Health Journal*, 9(1),
- Garrod, R., & Mathieson, T. (2017). Pursed lips breathing: Are we closer to understanding who might benefit?. *Chronic Respiratory Disorders*, 10(1), 3-4
- Guyton, A. C., & Hall, J. E. (2020). *Textbook of medical physiology* (14th ed.). Philadelphia: Elsevier.
- Handayani, T., & Putra, R. (2019). Analysis of risk factors for the occurrence of pneumonia in children under five years of age. *National Journal of Public Health*, 14(3), 120–128.
- Haryanto, D., Widodo, A., & Lestari, S. (2022). The effect of *pursed lips breathing exercise* on oxygen saturation and respiratory distress. *Indonesian Journal of Nursing*, 15(1), 1–10.
- Ministry of Health of the Republic of Indonesia. (2020). Indonesia's Health Profile in 2019. Ministry of Health of the Republic Indonesia. [https://doi.org/10.5005/jp/books/11257\\_5](https://doi.org/10.5005/jp/books/11257_5)
- Khasanah, S. and Maryoto, M. (2018). Effectiveness of Forward Leaning Position ( CKD ) and Pursed Lips Breathing ( PLB ) on Increasing Oxygen Saturation in Patients with Chronic Obstructive Pulmonary Disease ( COPD ).
- Kowalak, J., Welsh, W., & Mayer, B. (2016). Professional Guide to Pathophysiology. Jakarta: EGC.
- Muliasari , Y., & Indrawati, I. (2018). The Effectiveness of Pursed Lip Breathing Therapy on the Oxygenation Status of Children with Pneumonia. *Nursing Nurse* <http://ners.fkep.unand.ac.id/index.php/NE/RS/article/view/182/151>
- Mulyani, H., & Siregar, A. (2021). The effectiveness of respiratory therapy is simple in children with pneumonia. *Indonesian Journal of Child Nursing*, 9(2), 34–42.
- Mulyani, S., Raharjo, B., & Dewi, L. (2019). The relationship between nutritional status and the incidence of bronchopneumonia in preschoolers. *Journal of Nusantara Child Health*, 4(2), 88–95.
- Nelson, W. E. (2020). *Nelson textbook of pediatrics* (21st ed.). Philadelphia: Elsevier.
- Nugroho, T. (2015). Maternal, Pediatric, Surgical and Internal Medicine Nursing Care. Yogyakarta: Nuha Medika
- Nurarif, & Kusuma. (2015). Application of Nursing Care Based on Medic Diagnosis and NANDA NIC NOC. Yogyakarta: Mediaction.
- Potter, P. A., & Perry, A. G. (2019). *Fundamentals of nursing* (9th ed.). St. Louis: Mosby

- Elsevier.
- Putri, A., Hidayat, R., & Sari, M. (2019). The effect of *pursed lips breathing exercise* on the reduction of breathing frequency in bronchopneumonia patients. *Journal of Medical Nursing*, 6(1), 12–20.
- PPNI. (2016). Indonesian Nursing Diagnosis Standards. PPNI Central Executive Board
- PPNI. (2018a). Indonesian Nursing Intervention Standards: Nursing Definitions and Actions, Edition 1. PPNI Central Management Board.
- PPNI. (2018b). Indonesian Nursing Intervention Standards. PPNI Central Executive Board
- Rahmawati, F., & Putra, H. (2022). Environmental factors that affect the incidence of pneumonia in preschool-age children. *Indonesian Journal of Epidemiology*, 5(3), 200–207.
- Riyadi, & Sukarmin. (2015). Nursing Care in Children. Yogyakarta: Graha Ilmu
- Rizki, N., & Sari, D. (2020). Preschool age as a risk factor for pneumonia in children. *Journal of Primary Health*, 14(2), 67–74.
- Rohani, N., Dewi, A., & Yuliana, M. (2018). Gender distribution in children with pneumonia in regional general hospitals. *Journal of Health Sciences*, 10(1), 33–39.
- Roberts, S. E., Schreuder, F. M., Watson, T., & Stern, M. (2016). Do COPD patients taught pursed lips breathing (PLB) for dyspnoea management continue to use the technique long-term? A mixed methodological study. *Physiotherapy* (United Kingdom), 103(4), 465–470. <https://doi.org/10.1016/j.physio.2016.05.006>
- Santoso, R., & Wulandari, S. (2020). The effectiveness of respiratory relaxation techniques on the breathing patterns of lung disease patients. *Journal of Comprehensive Nursing*, 6(2), 102–110.
- Sari, A., Lestari, W., & Pranoto, Y. (2020). Differences in the incidence of pneumonia in boys and girls. *Journal of Healthy Nursing*, 12(1), 45–51.
- SDKI. (2017). Indonesian Nursing Diagnosis Standards. South Jakarta: SDKI DPP PPNI Working Group Team.
- SKI. (2018). Indonesian Nursing Intervention Standards. South Jakarta: PPNI DPP Working Group Team.
- SLKI. (2019). Indonesian Nursing Output Standards. South Jakarta: PPNI DPP Working Group Team.
- Samuel, A. (2016). Bronchopneumonia in Pediatric Patient. *J Agromed Unila*, Volume 1 Number 2 Page 185-189.
- Smeltzer, S., & Bare, B. (2013). Brunner & Suddarth Surgical Medical Nursing Handbook, 8th edition. Jakarta: EGC.
- Smeltzer, S. C., & Bare, B. G. (2019). *Brunner & Suddarth's textbook of medical-surgical nursing* (14th ed.). Philadelphia: Wolters Kluwer Health.
- Suriadi, & Yuliani, R. (2015). Nursing Care in Children. Jakarta: Sagung Seto.
- Wahyu, A., Fadilah, N., & Prasetyo, E. (2021). Characteristics of children with lower respiratory tract infections in type B hospitals. *Journal of Respira Nursing*, 9(1), 25–32.
- Wulandari, R., Nugraha, A., & Hidayati, F. (2021). Preschool age and incidence of bronchopneumonia in children. *Journal of Respiratory Health*, 7(2), 77–84.
- Waseem, M. (2020). Pediatric Pneumonia. Retrieved from Madscape: <https://emedicine.medscape.com/article/967822-overview>
- Yuliana, R., & Setiawan, B. (2022). Characteristics of bronchopneumonia in children by gender in hospitals. *Journal of Child Health Sciences*, 3(1), 15–22.
- WHO (2018) Pneumonia. Available at: <https://www.who.int/news-room/fact-sheets/detail/pneumonia>.
- WHO. (2020). Who New Pneumonia Kit 2020 Information Note. 1, 1–2. <https://www.who.int/news-room/fact-sheets/detail/pneumonia>
- Wijayaningsih, K. S. (2017). Child Nursing Care. CV. Trans Medical Info