

The Effect of Pianika Blow Therapy on the Respiratory Rate Values of Child Patients with Pneumonia at Prikasih Hospital

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Abstract

Background: Pneumonia is inflammation of the lung parenchyma in the alveoli and interstitial tissue caused by bacteria. The incidence of pneumonia in children <5 years in developing countries is higher when compared with developed countries, namely 10-20 cases/100 children per year, causing more than 5 million deaths per year in toddlers. Non-pharmacological techniques are currently in the spotlight as additional interventions for nursing care to overcome shortness of breath.

Objective: To determine the effect of pursed breathing lips therapy or blowing a piano on the respiratory rate of pediatric patients with pneumonia

Method: The research design used was a pre-experiment design, one group pre-test and post-test. This design involves one group being given a pre-test (O), given treatment (X) and given a post-test. Treatment success is determined by comparing pre-test scores and post-test scores. The research population and sample were 30 respondents, 15 control groups and 15 intervention groups. The research instrument uses a questionnaire. Statistical analysis uses a Paired Sample T-Test.

Results: Respiratory results before therapy were given were abnormal >30x/minute (83.3%), the child blew the piano with the tone given for 17 seconds, rested for 2 minutes and carried out 3 attempts. The results with an average child respiratory rate of 34.53 before and 32.13, mean that there was a decrease in the RR value before and after the PLB technique, was carried out. The effect of PLB (pianika blowing) therapy on the RR value of preschool children with pneumonia at Prikasih Hospital. P-Value 0.043.

Conclusion: Pursed Lips Breathing therapy is effective in increasing the RR value so this non-pharmacological therapy can be used as additional therapy for pneumonia patients. There is an effect of PLB (pianika blowing) therapy on the RR value of preschool-aged children with pneumonia at Prikasih Hospital.

Keywords: blowing pianist, pneumonia, pursed breathing lips therapy, respiratory rate

Introduction

Pneumonia is inflammation of the lung parenchyma in the alveoli and interstitial tissue caused by bacteria, with symptoms of high fever accompanied by cough with phlegm, rapid breathing (breathing frequency >50 x/minute), shortness of breath, and other symptoms of headache, anxiety, decreased appetite.¹ Data released by the World Health Organization (WHO) states that pneumonia is the cause of death for around 1.2 million children every year.² The incidence of pneumonia in children <5 years old in developing countries is higher compared to developed countries, namely 10-20 cases/100 children per year, causing more than 5 million deaths per year among children under five. This incident is mostly found in developing countries with the highest number of cases being India with 158,176 cases followed by Nigeria with the second highest number of 140,520 and Indonesia in seventh place.² According to the results of Riskesdas (2018), the incidence of pneumonia in Indonesia has increased from 2015 to 2018, namely from 4.0% to 4.5%, with the province with the highest incidence being East Nusa Tenggara at 10%.³

One of the children's health problems in the world that has not been resolved is pneumonia. In 2019, the United Nations Children's Fund (UNICEF) recorded globally that the child mortality rate due to pneumonia was quite high. In Indonesia, global estimates state that every 1 hour 71 children contract pneumonia.⁵ RSU Prikasih is a private hospital consisting of 7 inpatient rooms and 2 outpatient rooms. As for the special room for cases of children with respiratory problems, namely the lotus room, data was obtained for the last 2 years from March 2020 - March 2022. The most common cases of children with respiratory problems were 580 cases, including 280 cases of pneumonia (48.2%), bronchitis 120 cases (20.6%), asthma 60 cases (10.3%), and pulmonary TB 40 cases (6.9%).⁴

In children with pneumonia, the initial treatment most often given is pharmacological therapy by administering oxygen therapy and medication from a doctor. In this study, researchers want to try providing non-pharmacological therapy to these patients. As described, PLB (Pursed Lips Breathing) therapy is given to help overcome the problem of ineffective airway clearance in pneumonia sufferers. The aim is to identify the effect of pursed lip breathing on respiratory muscle strength, increasing oxygen saturation and respiratory rate in COPD patients.⁵ Pursed lips breathing is a way of breathing that aims to help ventilate the alveoli and improve gas exchange, increase the effectiveness of coughing, and reduce stress.⁸ Pursed lips breathing therapy is easier to give to children who already understand commands. It was proven that the results of the analysis showed that the respiration rate (RR) of respondents before being given the inflatable play activity was 42.73 times/minute and experienced a decrease in the RR value after being given the inflatable play activity of 37.47 times/minute.⁶

Several studies have explained, among other things, the effectiveness of pursed lips breathing on oxygenation levels in pneumonia. Another alternative to overcome the problem of ineffective airway clearance in children is to apply the Pursed Lips Breathing (PLB) technique.⁷ This technique can be used as an alternative to help overcome ineffective airway clearance in children. In addition, PLB is useful for increasing alveolar expansion in each lung lobe, so that alveolar pressure increases and can help push secretions into the airways during expiration and can induce normal breathing patterns.⁸ The results of other research show that there is a significant difference in the respiratory frequency and SpO₂ of COPD patients before and after being given breathing exercises using the pursed lips breathing technique. This research is in line with research conducted by, The pursed lips breathing technique is a breathing exercise that consists of two mechanisms, namely a deep and strong inspiration process and an active and long expiration mechanism. The expiratory process is said to be

normal if the process is carried out by exhaling without using energy.⁹

Based on a preliminary study conducted by interviews with 10 parents whose children were being treated with a diagnosis of pneumonia in the lotus room at Prikasih Hospital, it was found that 7 mothers said that while their children were sick, their children felt short of breath and coughed and even fussy, their children often said they were bored and wanted to go home quickly and go to school, in the hospital is quiet, there is no entertainment. Three parents said their children were bored of being told to do deep breathing exercises when their shortness of breath recurred. Based on the results of observations and actions to provide therapy by providing oxygen assistance using a nasal cannula and a simple mask, 8 patients when given oxygen therapy using a nasal cannula and a simple mask on average refused and were removed more often, so that the therapy was less than optimal. The other 2 children were calm and cooperative, but the results of the examination when the oxygen was removed, the RR results were still the same, there was no change. The description of the background and preliminary studies obtained attracted the interest of researchers who wanted to conduct research on the Effect of Pursed Lips Breathing Therapy (Blow Pianika) on the RR (Respiratory Rate) Value of School-Age Children with Pneumonia at Prikasih Hospital in 2023.

Method

The research design used was a pre-experiment design, one group pre-test and post-test. This design involves one group being given a pre-test (O), given treatment (X) and given a post-test. Treatment success is determined by comparing pre-test scores and post-test scores.¹⁰ The research population and sample were 30 respondents, 15 control groups and 15 intervention groups. The research instrument uses a questionnaire. Statistical analysis uses a Paired Sample T-Test.

Results

Table 1. Description of Respondent Characteristics (N=30)

Respondent characteristics	Result	
	Frequency	Percentage (%)
Age		
6 years – 11 years	29	96,7
12 years – 18 years	1	3,3
Gender		
Woman	14	46,7
Man	16	53,3
Total	20	100

Table 2. Description of the Average RR (Respiratory Rate) Value Before Pursed Breathing Lips Therapy at Prikasih Hospital (N=30)

RR value	Result	
	Frequency	Frequency
> 30x/minute	25	83,3
20-30 x/minute	5	16,7
total	30	100

Table 3. Effect of Pursed Breathing Lips Therapy (Blow Pianika) on the RR Value of School-Age Children with Pneumonia at Prikasih Hospital (N=30)

RR value	Mean	SD	SE	Paired Sample test	
				t	P-Value

Pre-test	34,53	.379	.069	-2.112	0.000
Post-test	32,13	.466	.085		

The average RR value level in the pre-test was 34.53 with a standard deviation of .379. In the posttest, the average RR value was 32.13 with a standard deviation of .466. It can be seen that the mean difference between the pre-test and post-test is 13. This means that there is a decrease in the RR value before and after the Pursed Lips Breathing technique. Based on the Paired Sample T-Test output, the RR value is Sig. (2-tailed) is $0.000 < 0.05$, so it can be concluded that there is an influence of Pursed Lips Breathing therapy (Blow Pianika) on the RR (Respiratory Rate) value of school-age child patients with pneumonia at Prikasih Hospital in 2023, meaning that H_a is accepted and H_0 is rejected.

Discussion

Average Value of Respiratory Rate for School-Age Children with Pneumonia After Pursed Breathing Lips Therapy (Blow Pianika)

In this study, almost (70%) of the respondents experienced an abnormal RR $>30x/\text{minute}$ and (30%) experienced a normal RR of $20-30x/\text{minute}$. In this study, the application of PLB provided education to parents and children on how to take a breath using a pianika with a shorter inspiration and a longer exhalation, blowing the pianika with a tone given for 17 seconds, resting for 2 minutes and providing therapy for 3 trials. This condition is an indicator for the intervention of the pursed lips breathing therapy technique, in which to maintain the breathing pattern to overcome the symptoms of shortness of breath, Deep breathing can be carried out by applying the pursed lips breathing technique of blowing the pianika.

This research is in line with research (Sadat 2022) that before the intervention is given, the researcher first provides examples of deep breathing techniques and blowing up balloons. After the subjects were able to follow the example correctly, the researcher then assisted in providing intervention. On the 1st day before intervention, the respiratory rate status was found to be below normal values. However, after carrying out the pursed lips breathing therapy technique, a change in the respiratory rate value was found.¹¹

In this study, researchers obtained results describing the average value of RR (Respiratory Rate) after Pursed Lips Breathing therapy (Blow Pianika) at Prikasih Hospital, almost all of them were abnormal $> 30x/\text{minute}$ 21 respondents (70%), almost half of them were normal $20-30x/\text{minute}$ 9 respondents (30%) with an average value of 32.13. From the results before and after being given pursed lips breathing therapy, it was found that it was still abnormal $> 30x/\text{minute}$, but the results of the respondents who were abnormal were different, the difference in the average value before 34.53 and after 32.13 can be concluded that there was a decrease of 2.40, meaning there was a change in value. RR before and after giving pursed lips breathing therapy. It is known that there is an effect of Pursed Lips Breathing therapy (Blow Pianika) on the RR (Respiratory Rate) value of school-aged children with pneumonia at Prikasih Hospital. Efforts that can be made to improve respiratory frequency in children with pneumonia are pharmacological and non-pharmacological methods. Pharmacological treatment of pneumonia is usually oxygenation and involves nebulizer steam treatment, while non-pharmacological treatment usually involves avoiding the causative factors and creating a healthy environment.

Several research results make it clear that non-pharmacological exercises such as pursed lips breathing, deep breathing relaxation, playing with blowing balloons, and blowing bamboo propellers can influence patient breathing patterns and improve oxygenation status in

pneumonia and tuberculosis patients.¹² Breathing exercises can be performed in several positions because air distribution and pulmonary circulation vary according to chest position.¹³

This research provides a pursed lips breathing therapy technique using a pianika, whereby blowing the pianika can produce a melody that can reduce anxiety and fear in children. Music therapy is a complementary and alternative treatment method that can be applied to all age groups, especially to children who are being treated in inpatient or outpatient clinics with various clinical conditions.¹⁴ According to Karbandi (2020), music therapy can improve children's psychosocial, physiological and emotional integration so that it can reduce children's anxiety. The positive influence obtained from music therapy can reduce anxiety in children and reduce children's fear of being hospitalized with chronic illnesses. So the researchers tried to modify the pursed lips breathing therapy technique by blowing a piano to achieve normal respiratory rate values and patient cooperation when given therapy.¹⁵

The simplest method for determining respiratory frequency is by counting directly (manually) the up-and-down movement of the chest cavity wall, or by listening to breathing sounds through a stethoscope, and the method for measuring heart rate is also very simple by counting manually by counting speed/jump of blood flow in the chest cavity, behind the knees (popliteal artery), in the middle of the legs, inside the elbows (under the biceps), wrists, above the stomach (abdominal aorta), earlobes, fingers, and neck, the interpretation of normal respiratory rate values for babies is 24-30 cycles per minute and for children it is 20-24 cycles per minute.

According to the researchers' assumptions, it was found that children who were taught to blow the piano to expand and deflate their lungs became more skilled and in a sitting position between the front and back lungs could inflate perfectly. The melody that is played is Mr. Yacob's expansion of the breath coming in from the nose out of the mouth resulting in a change from abnormal to normal. So in this study, there was a relationship between the difference before blowing the pianika and after blowing the pianika, there was a change in breathing from abnormal to normal with a breathing frequency of $> 30x/\text{minute}$ to $20 - 30x/\text{minute}$ in preschool-aged children.

The average RR value level in the pre-test was 34.53 with a standard deviation of .379. In the post-test, the average RR value was 32.13 with a standard deviation of .466. It can be seen that the mean difference between the pretest and post-test is 2.40. This means that there is a decrease in the RR value before and after the Pursed Lips Breathing technique. Based on the Paired Sample T-Test output, the RR value is Sig. (2-tailed) is $0.000 < 0.05$, so it can be concluded that there is an influence of Pursed Lips Breathing therapy (Blow Pianika) on the RR (Respiratory Rate) value of school-aged children with pneumonia at Prikasih Hospital in 2023.

Conclusion

It is known that the average RR (Respiratory Rate) value of school-aged children with pneumonia before Pursed Lips Breathing (Blow Pianika) therapy at Prikasih Hospital was almost (83.3%) experiencing an abnormal RR $> 30x/\text{minute}$, and (16.7%) experienced normal RR of $20-30x/\text{minute}$ and the average RR (Respiratory Rate) value of school-aged children with pneumonia after Pursed Lips Breathing (Blow Pianika) therapy at Prikasih Hospital, almost (70%) experienced an abnormal RR $>30x/\text{minutes}$ and (30%) experienced a normal RR of $20-30x/\text{minute}$. There is an effect of Pursed Lips Breathing therapy (Blow Pianika) on the RR (Respiratory Rate) value of school-aged children with pneumonia at Prikasih Hospital in 2023, p-value of $0.000 < 0.05$.

Conflict of Interest

This research is independent of any individual or organizational conflicts of interest.

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