



Do different positions affect the oxygen saturation and comfort level of children under five with pneumonia?

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KEYWORDS

Child;
Oxygenation;
Comfort;
Pneumonia;
Prone;
Semirecumbent

Abstract

Objective: Children with pneumonia need a correct position to increase their oxygen saturation and comfort level. Postural changes affect the function of the human body and disease conditions. This study aimed to identify the effect of prone and semirecumbent positions on the oxygen saturation and comfort level of children under five with pneumonia.

Method: The study design was a quasi-experimental with a pre-posttest control group design. Thirty-six children with pneumonia aged 0-59 months were selected using consecutive sampling and divided into three groups: prone (n = 12), semirecumbent (n = 12), and control (n = 12). Statistical analysis was conducted using the Wilcoxon test, paired t test, and Kruskal-Wallis test.

Results: A significant difference in the oxygen saturation level was found among the three groups, particularly in the semirecumbent group. No significant difference was observed on the comfort level in all groups.

Conclusions: The semirecumbent position can be applied to improve the oxygenation status of children under five with pneumonia. Therefore, nurses should teach the family how to position the children with pneumonia during their hospitalization.

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Introduction

Pneumonia is the cause of 15% of deaths of children under five around the world, with 2% of these children being infants. In 2013, about 935,000 children under five were estimated to have died of pneumonia; that is, more than 2,500 children died from the disease every day¹. Indonesia is one of the top 15 countries with the highest number of toddler mortality rate caused by pneumonia at 22,000 deaths in 2013^{2,3}.

Children with pneumonia undergo oxygenation problems and need oxygen therapy if the oxygen saturation level (SpO₂) is less than 90%⁴. One of the nursing interventions for children with oxygenation problems is positioning. Positioning is considered to affect the human body and various disease conditions in terms of the expansion of the lungs and the effects of gravity affecting the human body⁵.

The types of positioning that can be administered to patients with oxygenation problems are prone and semi-up-

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right. The prone position is considered to have a rapid effect in increasing the oxygenation level in the blood of patients with acute respiratory distress syndrome (ARDS) and reduces the mortality rate of patients with ARDS⁶. Conversely, the 45° semi-upright position, which is generally known as the semirecumbent position, is considered to have a rapid effect in increasing oxygenation in blood⁷. Moreover, the semirecumbent position adjustment can increase oxygenation and gas exchange in patients with mechanical ventilation⁸.

As children with pneumonia have oxygenation problems, an appropriate position to increase oxygenation and comfort is necessary⁹. The semirecumbent position may reduce coughing and the use of sedative medicines, and increase the patient's comfort unlike the supination position during the administration of bronchoscopy procedures¹⁰. As positioning of children with pneumonia has yet to become a focus of nursing, research needs to be conducted on the effect of prone and semirecumbent positioning on the oxygen saturation and comfort level of children under five with pneumonia.

Method

This research used a quasi-experimental design with a pre-posttest with a control group design. The intervention group was divided into two groups, namely, prone and semirecumbent. The control group conducted positioning according to the routine hospital procedure.

Sampling was conducted through consecutive sampling with the criterion of children under five, that is, aged 0-59 months, who were treated at the hospital where positioning

was administered to children with pneumonia without any contraindication. Each group consisted of 12 children; thus, 36 children participated in the research. Oxygen saturation measurement was conducted using pulse oximetry, and comfort level was measured using the FLACC observation sheet. Oxygen saturation measurement and comfort level observation were performed twice: before treatment (pretest) and 60 min after treatment (posttest). The prone group was placed on the prone position, with the head facing one side; the semirecumbent group was placed on a half sitting position at a 45° angle; and the control group was positioned in accordance with the hospital routine. Ethical approval was issued by the Research Ethics Committee of the Faculty of Nursing, Universitas Indonesia. The analysis was conducted using the Wilcoxon test and the paired t test. The Kruskal-Wallis test was used to compare the groups.

Results

The characteristic features of the respondents are as follows: less than 12 months old (age range of 1-31 months), male, mother's education level is primary school level, good nutritional status, breastfed, fully immunized according to their age, and living environment is under the unhealthy category.

Table 1 shows that the median value of oxygen saturation increases 60 min after semirecumbent positioning is administered and that of comfort level decreases 60 min after semirecumbent positioning is administered. The median values of the prone group and the control group remain unchanged. The lower the score is, the higher the comfort

Table 1 Analysis of the differences in oxygen saturation and level of comfort of the prone, semirecumbent, and control group adjustment positions (n = 36)

No.	Group	n	Median (minimum-maximum)	P value
Oxygen saturation				
1	<i>Prone</i>			
	Before	12	98 (95-99)	0.107
After	12	98 (95-100)		
2	<i>Semirecumbent</i>			
	Before	12	97 (91-99)	0.006*
After	12	98 (94-99)		
3	<i>Control</i>			
	Before	12	98 (95-99)	0.366
After	12	97.5 (94-99)		
Comfort level				
4	<i>Prone</i>			
	Before	12	1 (0-5)	0.2
After	12	1 (0-5)		
5	<i>Semirecumbent</i>			
	Before	12	3 (1-7)	0.202
After	12	2.5 (0-7)		
6	<i>Control group</i>			
	Before	12	3 (1-4)	0.671
After	12	3 (1-4)		

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