

Analysis of Nursing Clinical Practice with Chest Physiotherapy Innovation Intervention and Pronation Position on Airway Clearance in Pediatric Patients with Pneumonia in The Keruing Room

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Introduction: Pneumonia is also known as "the forgotten killer of children". Based on the 2018 Riskesdas report, the age prevalence of pneumonia among children aged 1-5 years was 2.1%. The prevalence of pneumonia in toddlers and children based on gender characteristics was (2.1%) in males and (2.0%) in females. After observations and interviews in the Keruing room of Harapan Insan Sendawar Hospital, it was found that the innovative intervention of chest physiotherapy and pronation position to improve airway clearance in pediatric patients with pneumonia had never been carried out.

Objective: The purpose of KIAN is to analyze the intervention of providing chest physiotherapy actions and pronation positions on improving airway clearance in pneumonia patients in the Keruing room. **Methods:** Sampling in this KIAN was selected according to the inclusion criteria desired by the researcher with a total sample size of five pneumonia clients.

Results and Discussion: From the results of the study, it was found that the provision of chest physiotherapy and a pronated position had changes in secretion production, breath sounds, oxygen saturation (SPO2), pulse and respiratory frequency (RR) in the five patients. So that the intervention of chest physiotherapy innovation and a pronated position is very effective in dealing with airway cleansing in pediatric pneumonia patients. **Conclusion:** Chest physiotherapy intervention and pronation position can reduce secretion production and increase SPO2 in paediatric pneumonia patients.

Keywords: Chest Physiotherapy; Pronation Position; Airway Cleansing; Pneumonia;

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Introduction

According to *World Health Organization* (WHO, 2016), pneumonia is the main killer of toddlers in the world, more than AIDS, malaria and measles (Adawiyah, 2016). Pneumonia is also referred to as the "forgotten pandemic" or "*the forgotten pandemic*", because there is not much attention to this disease, so pneumonia is also called the forgotten toddler killer or "*the forgotten killer of children*" (Bandaso et al., 2023). Ministry of Health of the Republic of Indonesia, (2016) stated that the results *Sample Registration System* (SRS) in Indonesia in 2014 pneumonia is the number 3 cause of death in toddlers, with coverage rates ranging from 20% – 30%, while in 2015 there was an increase to 63.45% (Hidayatin, 2019).

Data from the Indonesian Ministry of Health (2016), states that West Java is included in the top 10 with the highest number of pneumonia cases, namely 4.62%. Meanwhile, Basic Health research data (Riskesdas, 2022) states that the prevalence of pneumonia in children reaches 800,000 children. It was found in Papua (3.9%), followed by Yogyakarta province (3.1), Bengkulu province (3.5%), and East Kalimantan region (3.1%).

Based on the Riskesdas report in 2018, the prevalence of children in pneumonia is aged 1-5 years with a presentation of 2.1% (Pertiwi & Nasution, 2022). The prevalence of pneumonia in toddlers and children based on sex characteristics is as much as (2.1%) in men and in women as much as (2.0%). The prevalence according to region of pneumonia cases in toddlers is highest found in urban areas, which is as much as (3.5%), and in rural areas as much as (2.5%) based on data from (Ministry of Health RI, 2022).

The high number of cases in Indonesia, pneumonia in children is a public health problem. In an effort to stem the decline in child deaths due to pneumonia, the government implemented a program that integrates program pathways with the MTBS (*Structured Management Of Sick Infants*) approach. Some health centers treat pneumonia problems as soon as possible. One of the efforts made is to implement MTBS every child visit and complete immunization for children (Rina, 2023).

The main nursing problem encountered in pneumonia is ineffective airway clearance. The cause of ineffective airway clearance is secretions that are stuck in the airway, so that the child has difficulty breathing, there are additional breathing sounds such as snoring, ronchi and gurgling. One of the actions that can be done by nurses independently is chest physiotherapy, giving warm water drinks, positioning *Fowler* and *semi fowler* as well as the position of pronation (Sudirman et al., 2023)

Chest physiotherapy is one of the effective interventions performed to prevent the buildup of secretions. Research conducted by Sukma, Indiyani, and Andingyas in 2020, showed that there was a relationship between chest physiotherapy and decreased breathing frequency in children with pneumonia where it was found that the average

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breathing frequency was 26.6 times per minute before the procedure to 22.3 times per minute after the procedure.

In addition, chest physiotherapy can reduce ronkhi and cough sounds in children (Sukma, Indiyani, & Andingyas, 2020) at (Margareththa, 2022). While research conducted by Jasmine and Nurhaeni in 2018 showed that chest physiotherapy measures influenced the value of respiratory frequency and oxygen saturation (Jasmine & Nurhaeni, 2018). To overcome the problem in pneumonia patients whose breathing is not effective, nursing interventions will be carried out, including performing chest physiotherapy. Chest physiotherapy is the act of cleansing the airways by preventing the buildup of secretions in the lungs (Home & Triana, 2024)

Chest physiotherapy is a nursing movement performed with postural drainage, catching disorders of the respiratory system. The benefits of chest physiotherapy are that it helps remove the secret attached to the airway, increases the efficiency of the respiratory muscles, provides comfort, and improves ventilation. The right time to do chest physiotherapy is before meals and before going to bed (Rahmayani & Murniati, 2023)

Based on the results of research conducted by Titin Hidayatin (2019), with the title "The Effect of Chest Physiotherapy and Pursed Lips Breathing on Airway Clearance in Toddlers with Pneumonia" showed that before chest physiotherapy was carried out there were 30 toddlers who experienced ineffective airway clearance and after chest physiotherapy intervention on 30 toddlers, 24 toddlers were found whose airway clearance was effective so that only 6 toddlers experienced ineffective airway clearance with a p value of 0.000 (Hidayatin, 2019).

And also supported by a literature review that has been conducted by Vita in 2019, with the title "Literature Review of the Application of Chest Physiotherapy in Overcoming Airway Clearance in Children with Bronchopneumonia in the PICU Room of KRMT Wongsonegoro Hospital Semarang" concluded that the provision of chest physiotherapy is effective in clearing the airway (Sari & Sari, 2020)

The results of a preliminary study in the Keruing room of Harapan Insan Sendawar West Kutai Hospital based on observations and interviews from nurses in the Keruing room, stated that pneumonia cases are cases that enter the 10 most cases of disease every month. Data at HOSPITAL Harapan Insan Sendawar states that in the last 5 months from January to May 2023, the number of pneumonia cases in the Keruing room reached 132 patients (HIS HOSPITAL Keruing, 2023). Based on the description above, this study explains how effective the provision of chest physiotherapy innovations and pronation positions on improving airway clearance in pediatric patients with pneumonia in the Keruing room of HOSPITAL Harapan Insan Sendawar.

Method

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This research was conducted at Harapan Insan Sendawar Hospital. The implementation time is July 24 – August 5, 2023. This study used a nursing care approach by observing *pre* and *post* intervention in 5 patients. The population in this study was all pneumonia patients treated in the keruing room of Harapan Insan Sendawar hospital who fit the inclusion criteria. The inclusion criteria in this study were pediatric patients with pneumonia, patients with nursing problems ineffective airway clearance, and patients who had been nebulizer or other medical measures.

As for the number of samples in this study that have met the inclusion criteria standard, which is 5 people. While the exclusion criterion, patients with Pneumonia, as well as patients experiencing decreased consciousness. The data collection method is carried out by measuring oxygen saturation pre-test and post-test and interviews about the lifestyle of respondents then the results are recorded on the observation sheet that has been provided

The data collected in the analysis will then look at the progress of each group knowing the average difference and improvement in oxygen saturation, pulse and respiratory frequency.

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Result and Discussion

Situation analysis

Table 1
Analyzes Data

| Name | Data | Aetiology | Nursing Issues |
|-------------|---|---------------------|---------------------------------------|
| An. M | DS: – The mother said her son was coughing and congested and his phlegm was difficult to remove. DO: – Pasien looked pale and restless – Patient tightness – Attached O2 Nasal Cannula – There is the sound of rochi breathing and wheezing in both lung fields – RR: 68x/i – N: 130x/i – SPO2: 92% – Temp: 38.1°C – Productive cough – Ineffective cough | Retained secretions | Ineffective Airway Clearance (D.0001) |
| An. Y | DS: – The mother said her son was coughing and congested and his phlegm was difficult to remove. DO: – Pasien looked pale and restless – There is chest wall retraction – There is the sound of ronchi breathing in both lung fields – RR: 44x/i – N: 132x/i – SPO2: 96% – Temp: 37.8°C – Productive cough – Ineffective cough | Retained secretions | Ineffective Airway Clearance (D.0001) |
| An. C | DS: – The mother said her son coughed and his phlegm was difficult to remove. DO: – KU Medium – There was the sound of rochi breathing in both lung fields – RR: 45x/i – N: 102x/i | Retained secretions | Ineffective Airway Clearance (D.0001) |

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| Name | Data | Aetiology | Nursing Issues |
|-------|---|---------------------|---------------------------------------|
| | <ul style="list-style-type: none"> – SPO2 96% – Temp: 36.8°C – Productive Cough – Ineffective cough | | |
| An. T | DS: <ul style="list-style-type: none"> – The mother said her son had been coughing up phlegm since 3 days. DO: <ul style="list-style-type: none"> – Sputum is white – Productive cough – There was the sound of rochi breathing in both lung fields – RR: 44x/i – N: 110x/i – SPO2: 95% – Temp :36.8°C – Ineffective cough | Retained secretions | Ineffective Airway Clearance (D.0001) |
| An. E | DS: <ul style="list-style-type: none"> – The mother said her son was coughing out loud and overcrowded. DO: <ul style="list-style-type: none"> – Pasie looked pale and restless – Patient tightness – Productive cough – Sputum quintal – Attached O2 Nasal Cannula – There was the sound of rochi breathing in both lung fields – RR: 45x/i – N: 129x/i – SPO2: 95% – Temp: 38.5°C – Ineffective cough | Retained secretions | Ineffective Airway Clearance (D.0001) |

Source: Primary Data, 2023

Based on the table above, the nursing problem of ineffective airway clearance experienced by patients is caused by retained secretions. In the five patients, data were obtained, namely there was a productive cough and secretions were difficult to remove, this was in line with Ribut and Wahyu Ningsih (2018) said that children who experience coughing up phlegm often increase excessive mucus production in the lungs so that the mucus often accumulates and becomes thick so that it is difficult to remove. The age of patients in this study was children under the age of three years so the process for sputum / secretion secretion could not be done independently. Hidayati (2014) said that disruption of sputum expenditure transportation can cause sufferers to be more difficult to remove sputum. The ability of children to secrete sputum is influenced by several factors, one of

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which is age. Children in general cannot remove sputum / secretions independently, Sputum can be removed by administering mucolytic, expectorant, inhalation, and chest physiotherapy therapy.

Analysis of chest physiotherapy and pronation position with related concepts and research

Table 2

Pre and Post Test Evaluation of Chest Physiotherapy And Pronation Position

| | SPO2 | | Nadi | | RR | | Secretory Production | | Additional Breathing Sounds | |
|-------|------|------|------|------|-----|------|----------------------|-----------|-----------------------------|------|
| | For | Post | For | Post | For | Post | For | Post | Post | Post |
| An.M | 92 | 98 | 130 | 128 | 68 | 48 | Increased | Decreased | Ronchi | None |
| An. Y | 96 | 98 | 132 | 128 | 44 | 38 | Increased | Decreased | Ronchi | None |
| B.C | 96 | 99 | 102 | 89 | 45 | 32 | Increased | Decreased | Ronchi | None |
| An.T | 95 | 100 | 110 | 100 | 44 | 30 | Increased | Decreased | Ronchi | None |
| An. E | 95 | 99 | 129 | 100 | 45 | 35 | Increased | Decreased | Ronchi | None |

Source: Primary Data 2023

Based on the table above, it can be seen that there were changes in secretion production, breath sound, oxygen saturation (SPO2), pulse and breathing frequency (RR) in the five patients. In child M before chest physiotherapy and pronation position obtained SPO2 92%, pulse 130 x / m and breathing frequency 68 x / minute, but after chest physiotherapy and pronation position there were significant changes namely SPO2 98%, pulse 128 x / minute, and breathing frequency to 48 x / minute. In child E before chest physiotherapy and pronation position obtained SPO2 95%, pulse 129 x / minute and breathing frequency 45 x / minute but after chest physiotherapy and pronation position there were significant changes namely SPO2 99%, pulse 100 x / minute and breathing frequency to 35 x / minute

Research conducted by Titin (2019) said that there is a difference between airway clearance before and after chest physiotherapy intervention in children under five with pneumonia with a P Value of 0.000. Chest physiotherapy is very useful for people with respiratory diseases both acute and chronic. Chest physiotherapy is one of the physiotherapies that uses postural drainage techniques, chest percussion and vibration. Physiologically, percussion on the surface of the wall will send waves of various amplitudes and frequencies so that it can change the consistency and location of secretions.

Research conducted by Amin et al., (2018) showed that there was a significant change in breathing frequency per minute between before therapy and after therapy. The therapy given in the study was a combination therapy between chest physiotherapy and infrared (Amin et al., 2018).

Based on the author's analysis of a study in pediatric patients with pneumonia, before the intervention chest physiotherapy and secret expenditure pronation position were very few and difficult to remove, but after the intervention of chest physiotherapy innovation and the pronation position of the patient's secretion expenditure was more,

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secret production decreased, tightness decreased, SPO2 increased, breathing frequency and pulse improved, there was no additional breathing sound. This chest physiotherapy and pronation position is easy for parents to do alone. When the chest physiotherapy intervention and pronation position are carried out, the patient's parents pay attention and the researcher also teaches the patient's parents, so that if at any time their child suffers or experiences a similar disease or the same symptoms, parents can do it themselves at home or in a health care facility.

The researcher's assumption is why this chest physiotherapy and pronation position are performed? This is because before chest physiotherapy and pronation position, the patient's secret / phlegm discharge is very little and difficult to come out, but after chest physiotherapy and sputum / secret pronation position the patient comes out more so that it can reduce sputum production which will increase the clearance of the patient's airway.

Alternative Solutions That Can Be Done

Here are some alternatives that can be done in pneumonia patients with nursing problems, namely airway clearance is not effective. An alternative that can be done is with a combination technique of inflating super bubbles intervention and blowing bamboo propellers. In this intervention, researchers used balloon blowing therapy made of liquid soap which was then blown slowly and produced bubbles. This technique applies the principle of pursed lip breathing with the aim of practicing breathing, namely by expiration to be longer than inspiration to facilitate the removal of carbon dioxide from the body that is restrained due to airway obstruction (Widiyatmoko, 2018).

Meanwhile, playing blowing bamboo propellers is a game that requires deep inspiration and longitudinal expansion with the mouth propped up. The application of blowing bamboo propellers can train the flexibility or flexibility of the chest cavity so that it can expand and deflate optimally (Harsismanto, 2020).

Based on the results of the intervention innovation, chest physiotherapy interventions and pronation positions are combined with alternatives such as pursed lip to further maximize the expected results. With this combination innovation, it is expected to be more optimal and effective to overcome airway clearance and reduce sputum production, therefore research on this innovation intervention can be carried out and applied in nursing care

Conclusion

The conclusion of this study is that at the time of the study in pediatric patients with a medical diagnosis of pneumonia, the main complaints were ineffective coughing and increased secretion production, shortness of breath. There is an increase in respiratory frequency, pulse, increase in body temperature and there are some children experiencing a decrease in oxygen saturation. Nursing problems that arise are ineffective airway

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clearance, hyperthermia, activity intolerance, knowledge deficit in the elderly. The main nursing problem that children with pneumonia experience is ineffective airway clearance.

Then the results of the analysis obtained from five respondents found that there was a decrease in secretion production, airway clearance characterized by no additional breathing sounds, an increase in oxygen saturation, pulse and respiratory frequency improved after being given an innovative intervention of chest physiotherapy and pronation position. This intervention is effective in patients with nursing problems; airway clearance is not effective in medical diagnosis of pneumonia.

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