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Evaluating the Ineffectiveness of Chest Physiotherapy in Airway Clearance for Pneumonia Patients in the Hospital

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ABSTRACT

Pneumonia is a respiratory disorder that commonly affects children. It is often characterized by weakened vesicular breath sounds, along with fine and coarse crackles, which can lead to ineffective airway clearance. Chest physiotherapy is one of the treatments administered to pneumonia patients with impaired oxygenation. This study aims to describe the application of chest physiotherapy in managing ineffective airway clearance in pneumonia patients in the Aster Room of RSD dr. Soebandi Jember. This research employs a case study approach conducted over three days. Data collection methods included interviews, measurements, and observations. The evaluation results showed that the patient experienced a reduction in secretion production, as evidenced by decreased rhonchi sounds and reduced cough intensity. Chest physiotherapy has been proven effective in clearing sputum from the airways and reducing cough intensity in pneumonia patients.

Keywords: Pneumonia, Ineffective Airway Clearance, Chest Physiotherapy

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1. INTRODUCTION

Respiratory system disorders are diseases suffered by children. The presence of microorganisms, namely bacteria, viruses, parasites, and fungi, causes infection or acute inflammation of the lung tissue, which causes pneumonia. Pneumonia can be experienced by toddlers, children, adolescents, adults, and the elderly (Baidah, 2021). In most cases, the respiratory disorders that occur in children are mild. However, one-third of cases involving children receive special treatment (Pangesti & Setyaningrum, 2020). Physical examination, such as breath sounds, found vesicular and weakened sounds and the presence of wet, fine, and loud crackles, which could result in ineffective airway clearance (Syafiati et al., 2021).

UNICEF 2019 recorded the prevalence of child mortality with

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pneumonia of 16% of all children worldwide during the last 3 decades, or 880,000 children every year (Ginting & Nurhaeni, 2021). Based on RISKESDAS 2018, the prevalence of pneumonia has increased by 0.5%, with a total of 6,092 cases in Jember Regency (Ministry of Health of the Republic of Indonesia, 2018). The coverage of pneumonia case detection in toddlers in Jember Regency itself is only 34.36%, where the target is 60% (Health Office of East Java, 2020)

Impaired oxygenation requirements, such as ineffective airway hygiene in pneumonia, are standard. Chest physiotherapy is one of the treatments given to pneumonia patients with impaired oxygenation requirements (Baidah, 2021). Chest physiotherapy is a collection of techniques or procedures for removing secretions used independently or in combination so that secretions do not occur which cause airway obstruction. Chest physiotherapy will be more effectively applied to children with pneumonia because this is supported by its characteristic symptom, which is increased phlegm due to bacterial, viral, and fungal infections (Pangesti & Setyaningrum, 2020). Signs and symptoms of ineffective airway clearance can be reduced by chest physiotherapy. This is effective where thickened secretions in the respiratory tract come out, changes in respiratory frequency before and after chest physiotherapy is given and can improve the patient's quality of life (Aditya et al., 2022; Syafiati et al., 2022; Syafiati et al., 2021).

Based on the high incidence of pneumonia in toddlers, it is necessary to have a production intervention that is proven effective in overcoming the ineffectiveness of airway clearance in pneumonia patients.

2. METHODS

This study is a case study with a nursing care process approach. The research sample was a patient taken using a convenience sampling technique. Data were collected from a single respondent, a 4-month-and-5-day-old child, who underwent chest physiotherapy intervention for three consecutive days. The case study was conducted in the Aster Room of Dr. Soebandi Hospital, Jember. The achievement of implementation results is evaluated with the Indonesian nursing outcome standard guidelines.

On the first day, the researchers conducted a focused assessment of the patient, followed by data analysis, and obtained several nursing diagnoses, namely acute pain, unstable blood glucose levels, impaired physical mobility, and risk of infection (SDKI POKJA Team, SLKI, SIKI

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DPP PPNI, 2018). From the diagnoses that appear in patients, researchers are interested in re-evaluating and providing special treatment to nursing diagnoses of Ineffective airway by providing interventions in the form of Chest physiotherapy.

Chest physiotherapy includes techniques and devices to make coughing up excess, thick, or sticky mucus from your lungs easier. Some of them work to break up the mucus using vibration or by applying percussion (force) to the area of the lung that has mucus.

3. RESULTS

The following is a series of interventions for this patient, namely identifying indications, and identifying contraindications for chest physiotherapy, monitoring respiratory status, examining lung segments that contain excessive secretions, monitoring tolerance during the procedure, positioning the patient according to the lung area that has accumulated secretions, percussing with the palms position hands cupped for 3-5 minutes, do vibration with palms simultaneously with expiration, explain the purpose and procedure of chest physiotherapy. In addition, the client gets ventolin nebula therapy 3x1 + Nacl 2.5 cc.

Chest physiotherapy in this case study was carried out 3 times a day for 3 days, and each session was conducted for 10-15 minutes. On the first day, there was no change in the client's rhonchi and coughing sound. On the second day, the rhonchi in the right lung began to decrease, but a cough still accompanied the left lung. On the third day, rhonchi were found to have decreased in all the right and left lung fields without being accompanied by coughing. Parameters for the success of this action were Spo2 95-100%, respiratory rate 30-40x/minute, decreased sputum production, no rhonchi, no nostrils, and no intercostal retraction.

4. DISCUSSION

Pneumonia is an acute respiratory infection of the lungs. Pneumonia is an infection of the lung parenchyma caused by various organisms, such as bacteria, viruses, and fungi. The lungs are made up of tiny sacs called alveoli, which are filled with air when breathing. In pneumonia, infection can occur in the air sacs in one or both lungs. Children with pneumonia cause the lungs' ability to expand to decrease so that the body reacts by breathing rapidly to avoid hypoxia. If pneumonia worsens, the lungs become stiff, and the lower wall pulls inward. Children with pneumonia can die from

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hypoxia and sepsis (Supinganto et al., 2020). Pneumonia shows a clinical picture with the appearance of rhonchi, widening of the nostrils, and chest wall retraction (pulling of the lower chest wall inward). The factors that cause pneumonia have different signs and symptoms depending on age, causative germs, immunological status, and disease severity. Signs and symptoms of pneumonia are fever, cephalgia or headache, vomiting, bloating and diarrhea (experienced by clients who also experience gastrointestinal disorders), fatigue, in infants may not show signs of infection, chest pain when breathing, coughing, restlessness, nasal flaring, intercostal retraction, in infants the symptoms and signs of pneumonia are more diverse and not always clearly visible.

On percussion, no abnormalities are generally found (Aditya, 2020; Lestari et al., 2022). Pneumonia or pneumonia is an inflammation of the lungs caused by bacteria, viruses, or fungi. Pneumonia can occur due to the entry of microorganisms into the lungs. If through the respiratory tract, the microorganisms that enter will be fought by various human body defense systems. For example, an inflammatory process occurs by coughing or resistance by cells in the mucous layer of the throat to expel mucus (phlegm). Inflammation and infection of the lungs result in decreased ventilation because the alveoli are filled with inflammatory exudate. Ventilation-perfusion imbalance is usually manifested as hypoxemia. The systemic response to pneumonia is the body's response to a severe infection, namely fever. This indirect systemic response can be an indication that the infectious process is the cause of pulmonary infiltrates. After reaching the alveoli, pneumococci cause a typical response of four sequential stages (Jain et al., 2022).

In this study, the primary nursing diagnosis that emerged was ineffective airway clearance. Ineffective airway clearance is the inability to maintain airway clearance from foreign objects that block the airways. This causes airway obstruction due to the accumulation of secretions in the airways, which causes inadequate ventilation. Lower respiratory infections are usually more severe in children than upper respiratory diseases. They can include symptoms of respiratory disorders, namely coughing with excess secretions, shortness of breath, chest retraction, tachypnoea, and others. If infection or irritation occurs, the body will compensate by producing thick mucus to help the lungs avoid infection. If too much thick mucus blocks the airways, breathing becomes more complex (Turochman & Nuhan, 2022). Ineffective airway clearance

is the inability to maintain airway clearance from foreign objects that block the airways. This causes airway obstruction due to the accumulation of secretions in the airways, which causes inadequate ventilation. In children, symptoms of lower respiratory infections are usually more severe than upper respiratory diseases. They can include symptoms of respiratory disorders, namely coughing with excess secretions, shortness of breath, chest retraction, tachypnoea, and others. If infection or irritation occurs, the body will compensate by producing thick mucus to help the lungs avoid infection. If too much thick mucus is blocking the airways, breathing becomes more difficult... (Turochman & Nuhan, 2022). Purnamiasih (2020) also said that chest physiotherapy is also effective for neonates, where it can increase oxygen saturation and improve their respiratory status (Purnamiasih, 2020). Chest physiotherapy not only prevents pulmonary obstruction but can also prevent damage to the respiratory tract. Several forms of physiotherapy, namely positioning, tapping, and giving vibrations, are helpful for patients with acute or chronic respiratory diseases, especially for children with airway disorders who cannot cough effectively (Fera et al., 2022). Chest physiotherapy effectively mobilizes tracheobronchial secretions, improves respiration rate, freeing the airway, and increases gas exchange to reduce or avoid other complications. The effective parameters can be monitored from respiration rate and oxygen saturation (Oktaviani & Nugroho, 2022; Polapa et al., 2022). Chest physiotherapy also affects the length of stay and speeds up the child's ability to breathe normally. It also depends on various obstacles, such as uncooperative children, so chest physiotherapy cannot be done routinely (Tehupeiory & Sitorus, 2022). Discomfort due to unergonomic positioning for 5-10 minutes, repeated tapping, and vibration can increase oxygen use, increasing the client's oxygen saturation level. Chest physiotherapy aims to release and help move secretions from the small airways into the trachea (Hidayatin, 2019).

5. CONCLUSION

After the implementation of chest physiotherapy, which was carried out 3 times a day for 3 days, each session was conducted for 10-15 minutes. There is a gradual change, which is monitored through the sound of rhonchi, which progressively decreases. This shows that active chest physiotherapy in dealing with airway clearance problems is ineffective in toddlers. This action is relatively easy and

practical, so the client's family can do it independently and apply it at home.

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AUTHOR CONTRIBUTIONS

Substantial contribution to conception, data collection, analysis, writing manuscript and revision: Fandi Ahmad Kurniawan Setia Budi.

CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

DATA AVAILABILITY STATEMENT

The data are not publicly available due to privacy or ethical restrictions.

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