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Nursing Implementation of Ineffective Breathing Patterns in Toddlers with Acute Respiratory Infection: A Case Study

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Abstract:
Acute Respiratory Infection is an upper and lower respiratory tract infection that attacks the throat, nose and lungs at mild to severe levels lasting approximately 14 days. This study uses a case study method in the form of a description of the nursing care process in patients in accordance with the theory and contains a discussion of nursing actions that occur in the field. This study was conducted for 3 days with a total of 3 visits to patients starting from 15-17 May 2023, data obtained from interviews, observations, physical examinations. This study uses the concept of nursing care starting from assessment, appointment of nursing diagnoses, provision of nursing interventions, nursing implementation and nursing evaluation carried out for 3 days. the instrument used is the surgical medical nursing care assessment format. The results obtained by Baby D that he was less congested after being given nebulizer therapy, pulse: 160x/min, Temperature: 36.70C, respiration rate: 55x/min, Spo2: 99%, baby D still looks a little tight, using a breathing apparatus (nasal cannula), the client's general condition has improved slightly. It is expected that clients and families maintain and improve health by implementing a healthy lifestyle and utilizing existing health facilities for health control to accelerate recovery, so that the problem of Ineffective Breathing Patterns in clients with Acute Respiratory Tract Infection can be resolved.

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INTRODUCTION

Acute Respiratory Infection is an upper and lower respiratory tract infection that affects the throat, nose, and lungs at mild to severe levels, lasting approximately 14 days (Entianopa et al., 2023). This disease is most prevalent in developing countries, with a growing and uncontrolled population, resulting in population density in an area that needs to be better organized regarding social, cultural, and health aspects (Penington, 2021). In addition, acute respiratory infections are the third leading cause of morbidity and mortality worldwide and the leading killer in low- and middle-income countries. Deaths from acute respiratory infections are ten to fifty times higher in developing countries than in developed countries. Acute respiratory infections belong to the group of air-borne diseases that transmit the disease through the air. Pathogens enter and infect the respiratory tract and cause inflammation (Prastiwi et al., 2022).

According to the Ministry of Health of the Republic of Indonesia, cases of acute respiratory infections reached 28%, with 533,187 cases found in 2016, with 18 provinces having a prevalence above the national rate (Ministry of Health of the Republic of Indonesia, 2018). Acute Respiratory Infection (ARI) in developing countries causes high child mortality rates. Several factors that play a

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role in developing ARI in children include nutritional status, exclusive breastfeeding, birth weight, ventilation, parental smoking status, and air humidity (Kurniyawan et al., 2023).

Acute Respiratory Infection consists of infectious agents and non-infectious agents. The most common infectious agents that can cause acute respiratory infections are viruses, such as respiratory syncytial virus (RSV), nonpolio enterovirus 7 (coxsackie viruses Adan B), Adenovirus, Parainfluenza, and Human metapneumo viruses. Infectious agents other than viruses can also cause ARI, staphylococcus, Haemophilus influenza, Chlamydia trachomatis, mycoplasma, and pneumococcus (David et al., 2013).

ARI's clinical course begins with the virus's interaction with the body. The entry of the virus as an antigen into the respiratory tract will cause the cilia on the surface of the airway to move upwards, pushing the virus toward the pharynx or with a reflex spasm captured by the larynx. If the reflex fails, the virus damages the epithelial layer and mucosal layer of the respiratory tract. Viruses that attack the upper airway can spread to other places in the body, causing seizures and fever, and can spread to the lower airway, so that bacteria that are usually only lowered in the upper respiratory tract will infect the lungs, causing respiratory system disorders with nursing problems ineffective breathing patterns and ineffective airway clearance. If not treated immediately, it will lead to complications such as empyema, acute otitis media, atelectasis, emphysema, and meningitis (Nurarif & Kusuma, 2015; Fuad, 2016).

STUDY DESIGN

Research Design

This case study research explores a problem or phenomenon with detailed limitations, has in-depth data collection, and includes various information. Case studies are limited in time and place and are studied as individual activity events. This case study explores the nursing care problem for Baby D, who has an acute respiratory tract infection, with the nursing problem of ineffective breathing patterns in the Melati Room of Dr. H. Koesnadi Hospital. The inclusion criteria in this study were clients who met: 1) Aged 1 month to 4 years; 2) coughing for approximately 2-3 days; 3) tightness; 4) Family signed informed consent. Informed consent is obtained by first explaining this research to the client's family along with the objectives and results to be obtained.

Research Sample

The samples in this study were children admitted to the Melati Room of Dr. H. Koesnadi Hospital with URI complaints who met the inclusion criteria, namely male or female gender, aged 0-36 months, shortness of breath, and their families agreed to be respondents.

Place and Time of Research

This study was conducted in the Jasmine Room of Dr. H. Koesnadi Hospital in 2023 for three days from 15 May - 18 May 2023.

Data Collection

Data was collected using the surgical medical nursing care assessment format. The data collection methods used include 1) Interviews (anamneses results contain client identity, main complaints, history of present illness, history of past illness, family history of illness, and others) data sources obtained from clients, families, and nurses; 2) Observation and physical examination (with the approach of inspection palpation percussion and auscultation) on the client's body

system; 3) Document study and questionnaire (the results of the examination of relevant client data).

After the data is obtained, the researcher will formulate nursing diagnoses based on Indonesian nursing diagnosis standards and plan interventions following Indonesian nursing intervention standards.

Research Ethics

This research has been ethically tested at the Health Research Ethics Commission of the Faculty of Health, Muhammadiyah University of Jember, with number NO. 0195KEPK/FIKES/XII/2023.

PATIENT INFORMATION

Table 1. Data Analysis According to Examination Result

Date/hour	Data	Etiology	Problem
May, 2023 10.07	- The client's family said Baby D was hot with tightness and cough since approximately 2 days, tightness and vomiting 1x and Baby D was fussy and difficult to sleep. - There is ronchi sound - The client appears to be coughing - The client appears to be using a breathing apparatus (nasal cannula) - The client appears to be attached to an IV - Pulse: 173 x/min - Temperature: 37.7C - Respiration rate: 56x/min - Spo2: 98% - Body height 50 cm - Head circumference 35 cm - Chest circumference: 32cm - Upper arm circumference 11.5cm - Weight before illness 7.2 kg - Weight during illness 7 kg	Viruses, Bacteria secrete toxins ↓ Inflammation of the lung parenchyma ↓ Consolidation of lung connective tissue exudates ↓ Decreased lung compliance ↓ Lung development is not maximized ↓ Shortness of breath ↓ Ineffective breathing pattern	Ineffective breathing pattern

THERAPEUTIC INTERVENTION

The implementation carried out by researchers on day 1 was to explain the objectives and monitoring procedures, collaborate on oxygen administration, monitor breathing patterns (such as bradypnea, tachypnea, hyperventilation, Kussmaul, Cheyne-Stokes, Biot ataxic), monitor for

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airway obstruction, monitor oxygen saturation, provide Ventolin 2 cc nebulizer therapy (1cc ventolin + 1cc Ns), and document monitoring results. On day 1, the client's response was also obtained through subjective data and objective data, including the client's family said baby D still looked tight and coughing, the general condition was weak, the client appeared to be using a nasal cannula oxygen device, there was additional ronchi sound, there was obstruction in the airway and coughing, pulse: 169x/min, Temperature: 37.0, respiration rate: 50x/min, Spo2: 98%. The analysis that emerged on the first day was that the nursing problem of ineffective breathing patterns still needed to be resolved. So the researcher did the same implementation on the second day with the results of Baby D's family saying it was less tight after being given 2cc nebulizer therapy (1cc Ventolin + 1cc Ns), Pulse: 160x/min, Temperature: 36.7 C, respiration rate: 55x/min, Spo2: 99%, baby D still looks a little tight, using a breathing apparatus (nasal cannula), the client's general condition has improved slightly.

DISCUSSION

Acute respiratory infection is an infectious disease that affects one or more parts of the airway, starting from the nose (upper tract) to the alveoli (lower tract), including its external tissues, such as the sinuses, middle ear cavity, and pleura. acute respiratory infection is a respiratory infection that lasts for 14 days. acute respiratory infection is a disease that is commonly found in toddlers and children ranging from mild to severe acute respiratory infections. severe acute respiratory infections, if they enter the lung tissue, will cause pneumonia. Pneumonia is an infectious disease that can cause death, especially in children (Jalil, 2018). Based on the results of Basic Health Research in Indonesia in 2018, acute respiratory infections in toddlers experienced an increase in incidence that accounted for 20%-30% of all under-five mortality rates (Ministry of Health of the Republic of Indonesia, 2018). In 2019, based on data obtained from the Ministry of Health's Health Profile book, the prevalence of acute respiratory infections in toddlers in Indonesia was 3.55% of the total cases of 7,639,507 (Ministry of Health of the Republic of Indonesia, 2020).

According to Rosana (2016), signs and symptoms of acute respiratory infections usually appear quickly, within a few hours to a few days. Acute respiratory infections in toddlers can cause a variety of signs and symptoms. In addition to medical problems, acute respiratory infections also cause nursing problems that often arise in acute respiratory infections are ineffective breathing patterns. According to the Indonesian Nursing Diagnosis Standards, ineffective breathing patterns are Inspiration and/or expiration that does not provide adequate ventilation of the respiratory center, which is described by Orthopnea, Pursed-lip breathing, Nasal lobe breathing, Increased anterior-posterior thoracic diameter, Decreased minute ventilation, Decreased vital capacity, Decreased expiratory pressure, Decreased inspiratory pressure, Chest excursion changes (PPNI, 2017).

Ineffective breathing patterns in toddlers with acute respiratory infections are also caused by excess mucus production in the lungs. Phlegm or sputum will usually accumulate until it is thick and becomes difficult to expel (Aryayuni & Siregar, 2019). In addition to being given therapy to overcome the problem of acute respiratory infections, families are also given education about acute respiratory infections. Controlling acute respiratory infections requires health promotion efforts to improve people's ability to live healthy lives and be able to develop health and create a conducive environment. The role of health promotion is a joint task between health workers and the community (Hapipah et al, 2021).

Signs and symptoms of acute respiratory infections include coughing, difficulty breathing, sore throat, runny nose, earache, and fever. From the results of the assessment on the first day

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obtained data that the family said Baby D was hot with shortness and cough for approximately 2 days, tightness and vomiting 1x and Baby D was fussy and had difficulty to sleep, There is a Ronchi sound, using a nasal cannula breathing apparatus 3 Liters per minute, Pulse: 173 x/min, Temperature: 37.7$_o$C, Respiration rate: 56x/min, Spo2: 98%, Lactated Ringer Infusion 15 drops per minute, neutrophil 8.85x10 10^mg/uL. Cough that appears in toddlers with acute respiratory infections is a defense reflex for tracheobronchial irritation and a mechanism to clear the lower airway. Coughing is also a defense reaction that can protect the lungs (Astuti et al., 2019).

In addition, Baby D's body temperature increased to 37.7$_o$C. The fever felt by the child was due to a respiratory infection caused by pneumonia. Almost 70% of pneumonia occurs due to bacterial infection, which is often preceded by a viral infection, which is then coupled with a bacterial infection. The virus that is often the main cause of pneumonia is respiratory syncytial virus (Mahmud, & Samiun, 2022). In addition, Baby D had shortness of breath with additional Ronchi sounds. One of the additional breath sounds, also called abnormal breath sounds, is Ronchi. Ronchi is a low-pitched, sonorous, raspy additional breath sound that occurs in the large airways such as the lower trachea and main bronchi. This sound is heard as air passes through the narrowing caused by airway obstruction. This is the cause of the decrease in Ronchi in patients with ARI due to obstruction in the airway in the form of sputum (Mubarak, 2008).

Nursing planning refers to the Indonesian Nursing Intervention Standard book. ie: Respiration Monitoring, Action/observation: monitor frequency, rhythm, depth, and effort of breathing, monitor breathing patterns (such as bradypnea, tachypnea, hyperventilation, Kassulmaul, Cheyne-Stokes, Biot, ataxic), monitor effective coughing ability, monitor airway obstruction, monitor sputum production, monitor oxygen saturation, auscultate breath sounds. Therapeutic: Adjust respiration monitoring intervals according to the patient's condition, Document monitoring results. Education: Explain the purpose and procedures of monitoring, and inform the results of monitoring, if necessary (PPNI. 2017).

Baby D was also given 2cc Nebulizer therapy (1cc Ventolin + 1cc Ns). Nebulizer therapy is said to be able to overcome ineffective breathing patterns if the patient's shortness of breath decreases, sputum decreases, phlegm is thinner, Bronchospasm decreases or disappears, and bronchial hyperactivity decreases, and infection is resolved with aerosol or inhalation drugs (Wahyuni, 2014). The results of research conducted by Saini & Dalle (2023) found that there was an effect of inhalation therapy with a nebulizer on increasing oxygen saturation in clients with asthma attacks described by a significant difference in oxygen saturation values before and after inhalation therapy with nebulizer.

CONCLUSION

The nursing problem of ineffective breathing patterns is a problem that often arises in respiratory tract infections. The necessary management can be provided comprehensively through nursing care based on the standard diagnosis and standardized nursing interventions in Indonesia. The management provided is not only limited to nursing actions but requires collaboration between them, such as doctors, in terms of providing pharmacological therapy. In addition, promotive and preventive actions are needed to prevent respiratory infections, especially in toddlers.

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CONFLICT OF INTEREST

There is no conflict of interest in this research

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