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Case Study: Implementation of Simple Inhalation Therapy Using Eucalyptus Oil Aromatherapy for Ineffective Airway Clearance in a Child with Acute Respiratory Infection

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ABSTRACT

Introduction: Upper Respiratory Tract Infections (URTIs) are acute infections that affect the respiratory tract from the nose to the alveoli, including related organs such as the sinuses, middle ear cavity, and pleura. According to the World Health Organization (WHO) report in 2024, URTIs account for 6% of the global disease burden, resulting in approximately 6.6 million child deaths annually, with 95% of these fatalities occurring in low-income countries. The incidence of pneumonia in West Java was reported at 32.2% in 2020, increasing to 44.9% in 2022. Data from Ciamis Regency indicates that URTIs represent the disease with the highest prevalence. In 2019, the highest number of cases of pneumonia among toddlers was recorded in Cipaku (350 cases), Rancah (324 cases), and Banjarsari.
Objective: The objective of this case study is to examine children experiencing Upper Respiratory Tract Infections (URTIs) with ineffective airway clearance.
Method: The research design employed is a descriptive case study with a nursing care approach for children with Upper Respiratory Tract Infections (URTI).
Result: The results of the case study during the assessment phase revealed that the client was experiencing productive cough. Following the assessment, a diagnosis of Upper Respiratory Tract Infection (URTI) was established, specifically identifying ineffective airway clearance (D. 0001) related to retained secretions. The intervention plan focused on administering simple inhalation therapy using eucalyptus oil aromatherapy. This inhalation was conducted for 10-15 minutes in two sessions per day, in the morning and evening, over a consecutive three-day period. The evaluation indicates an improvement in airway patency in the patient, An.M, diagnosed with URTI.
Conclusion: In conclusion, the implementation of simple inhalation therapy using eucalyptus oil has proven to be effective in demonstrating improvements in airway clearance in the patient, An.M.

Keywords: aromatherapy, ineffective airway clearance, upper respiratory tract infection

Introduction

Upper Respiratory Tract Infection (URTI) is an acute infection that affects the respiratory tract, extending from the nasal passages to the alveoli, and includes associated organs such as the sinuses, middle ear cavity, and pleura. The etiological agents of Upper Respiratory Tract Infections (URTIs) are primarily viruses and bacteria (Afdhal, Arsi, & Saputra, 2024). The World Health Organization (WHO) reports that Upper Respiratory Tract Infections (URTIs) account for 6% of the global disease burden, resulting in approximately 6.6 million child deaths annually, with 95% of these fatalities occurring in low-income countries. Risk factors for URTIs include inadequate access to healthcare services, malnutrition, insufficient sanitation, pollution, and overcrowded living conditions (Taufik, Hamzah, & Harun, 2024).

The Indonesian Ministry of Health has reported a dramatic rise in cases of Acute Respiratory Infections (ISPA) from 2021 to 2023, escalating from under 3,000 cases in 2021 to between 50,000 and 70,000 in 2022, and surpassing 200,000 cases by early January 2023 (Suryani, Sampurna, & Purwanti, 2024). In West Java, according to the Riskesdas survey conducted in 2018, the prevalence of pneumonia among children under five years of age was recorded at 4.62%, which is higher than the national average of 4%. This indicates that the percentage of children affected by pneumonia in West Java is greater than the overall percentage in Indonesia. The reported cases of pneumonia in West Java were 32.2% in 2020, which increased to 44.9% in 2022 (Suryani et al., 2024).

Data on Upper Respiratory Tract Infections (URTIs) in Ciamis Regency indicates that URTIs are the diseases with the highest prevalence rates. In 2019, the highest number of cases of pneumonia among children under five years of age was reported in Cipaku (350 cases), Rancah (324 cases), and Banjarsari 294 cases (Wibowo & Ginanjar, 2020). Complementary therapy that can be administered to patients with Upper Respiratory Tract Infections (URTIs) includes simple inhalation using eucalyptus oil. Simple inhalation is a technique that aids in alleviating shortness of breath by providing inhalation therapy. This method helps to clear the airways, facilitate breathing, and thin mucus or secretions. The objective of simple inhalation with eucalyptus oil is to enhance the cleanliness of the airways in patients suffering from URTIs (Heltty et al., 2024).

Simple inhalation involves inhaling steam with or without medication through the upper respiratory tract. In this context, it serves to facilitate easier breathing, thin secretions for easier expulsion, and maintain moisture in the mucous membranes of the airways (Sembiring & Hasibuan, 2025). Inhaling warm steam into the respiratory tract is a method to improve ineffective airway clearance. Simple inhalation involves the inhalation of warm steam to thin mucus, facilitate breathing, relieve the airways, and reduce shortness of breath (Anisah, 2025).

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Figure 1. Eucalyptus

Eucalyptus oil is an essential oil derived from the leaves of the eucalyptus plant (Eucalyptus globulus). This oil contains a complex chemical composition, consisting of several key compounds, including 1,8-Cineole (eucalyptol). This compound is the main component of eucalyptus oil and possesses anti-inflammatory, antibacterial, and antiviral properties. 1,8-Cineole (eucalyptol) has a positive effect on airway cleanliness due to its anti-inflammatory and mucolytic properties. α-Pinene exhibits significant mucolytic properties, facilitating the thinning of mucus and aiding in the expulsion of secretions from the respiratory tract. β-Pinene also possesses significant mucolytic and anti-inflammatory properties, allowing for mucus thinning. Limonene has anti-inflammatory and mucolytic properties that can help thin mucus and alleviate inflammation in the airways. α-Terpineol has anti-inflammatory and antiseptic properties that can contribute to airway cleanliness (Chen et al., 2024). Based on the analysis presented above, further research is needed to investigate the effects of simple inhalation utilizing eucalyptus oil aromatherapy on the health conditions of children experiencing Upper Respiratory Tract Infections (URTIs).

Objective

The objective of this case study is to implement simple inhalation using aromatherapy with eucalyptus oil (Eucalyptus Oil) in children experiencing Upper Respiratory Tract Infections (URTIs) with ineffective airway clearance.

Method

The writing of this scientific paper employs a descriptive case study method with a case study approach. The descriptive method is a research approach aimed at detailing or explaining a phenomenon, object, or situation in a precise and accurate manner. This method focuses on describing what is happening rather than exploring why or how it occurs (Yuliani & Supriatna, 2023). A case study is a research method that conducts an in-depth analysis of the context, conditions, and position of an event. The subjects under investigation may include individuals, groups, institutions, or communities. Data is collected through techniques such as interviews, observations, and documentation (Sinaga, 2025).

In this case study, the author collected data through a series of steps that included assessment, diagnosis determination, nursing planning, intervention implementation, and

evaluation of the patient, An.M, who is experiencing Upper Respiratory Tract Infections (URTIs) at Dr. Euis Kusnawan Clinic. The focus of the intervention in this research is the administration of simple inhalation using eucalyptus oil aromatherapy (Eucalyptus Oil) to address the issue of ineffective airway clearance. Data were obtained through clinical observations and interviews with the patient, as well as assessments of the therapeutic responses provided.

Assessment of respiratory distress was conducted through clinical observation, with parameters including respiratory rate, effort of breathing, as well as the presence of chest retractions and cyanosis. The use of objective scales such as the Respiratory Distress Observation Scale (RDOS) aids in ensuring measurement consistency. Prior to the intervention, informed consent was obtained in writing from the patient's guardian after a comprehensive explanation regarding the study's objectives, procedures, benefits, and risks was provided. This process was conducted in accordance with the applicable ethical guidelines for health research.

Result

The assessment results indicates that on Thursday, May 29, 2025, at 14:00 WIB, the client's mother reported that the client had been experiencing a runny nose or nasal congestion for the past two days, accompanied by a productive cough and a respiratory rate of 25 breaths per minute, with additional auscultatory sounds of rhonchi. The client's family noted that the client had previously experienced similar symptoms and reported that the client had never fallen or had an accident, had not undergone any surgical procedures, and had no history of allergies. Upon physical examination, the client exhibited normal condition with intact sensorium and a Glasgow Coma Scale (GCS) score of E4V6M5. The recorded vital signs included a pulse rate of 115 beats per minute, a temperature of 36.7 degrees Celsius, and a respiratory rate of 25 breaths per minute. Additional auscultatory sounds of rhonchi were noted during examination.

Table 2. Data analysis

No	Symptom	Etiologi	Problem
1	**DS :** The client's mother reported that An.M has been experiencing a runny nose or nasal congestion for the past two days. **DO :** - P: 115 - R: 25 x/menit - S: 37,6 - There are additional sounds (rhonchi). - Looks secretive/mucoid	Risk Factors for Upper Respiratory Tract Infections: Bacteria, Viruses, Fungi, Aspiration, Environment Inflammation of the respiratory tract ↓ Upper Respiratory Tract Infection (URTI). ↓ Excessive systemic production. *Systemic accumulation.* (D.0001) Ineffective Airway Clearance.	(D.0001) Ineffective Airway Clearance.

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Tabel.3 Nursing Outcomes and Interventions.

SLKI	SIKI
Airway Clearance (L.01001) After nursing interventions have been performed for 24 hours, it is expected that Airway Clearance will improve with the following Outcome Criteria: 1. Effective cough improves 2. Systemic production decreases 3. Wheezing decreases 4. Wheezing improves 5. Respiratory rate improves 6. 6. Breathing pattern improves	Airway Management (I.01011) **Observation** 1. Monitor breathing pattern (frequency, depth, effort) 2. Monitor adventitious breath sounds (e.g., gurgling, wheezing, dry rales) and systemic factors (amount, color, odor) **Therapeutic** 1. Position in Semi-Fowler or Fowler position 2. Provide warm fluids 3. Perform chest physiotherapy if necessary 4. Administer Simple Inhalation of Eucalyptus Oil Aromatherapy **Education** 1. Teach effective cough techniques **Collaboration** Collaborate on the administration of bronchodilators, expectorants, and mucolytics if necessary.

Nursing implementation is a series of activities carried out by nurses to assist patients in transitioning from their current health status to a better health status, which reflects the outcome criteria. The implementation of nursing care consists of three types: independent implementations, interdependent or collaborative implementations, and dependent implementations (Mediarti, Sashabila, & Syokumawena, 2025).

The implementation strategy emphasized by the author to address Acute Respiratory Infection (ARI) with Ineffective Airway Clearance is the administration of simple inhalation using Eucalyptus Oil Aromatherapy to resolve the issue of ineffective airway clearance in patient An.M, who is experiencing Upper Respiratory Tract Infection (URI) at Dr. Euis Kusnawan Clinic.

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Tabel. 4 Nursing Evaluation

Diagnosis	Day - 1
Ineffective Airway Clearance related to retained secretions (D.0001)	**S:** - The client's mother reports that her child still has a runny nose accompanied by productive cough. **O:** - Respiratory rate: 25 breaths per minute - Adventitious breath sounds: rhonchi - Sputum is observed - Color: yellow to greenish - Characteristic odor of secretions **A:** - Ineffective Airway Clearance issue remains unresolved **P:** - Continue Intervention No. 1,2,3,4. **I:** - Monitor breathing pattern (frequency, depth, effort) - Monitor adventitious breath sounds (e.g., gurgling, wheezing, dry rales) and systemic factors (amount, color, odor) - Position in Semi-Fowler or Fowler position - Administer Simple Inhalation of Eucalyptus Oil Aromatherapy **E:** - Interventions are partially resolved **R:** - Interventions will be continued
Diagnosis	**Day - 2**
Ineffective Airway Clearance related to retained secretions (D.0001)	**S:** - The client's mother reports that An.M's runny nose accompanied by productive cough has decreased compared to before. **O:** - Respiratory rate: 23 breaths per minute - Adventitious breath sounds: decreased rhonchi - Client's sputum appears to have decreased - Color: yellowish-green - Characteristic odor of secretions **A:** - Ineffective Airway Clearance issue is partially resolved **P:** - Continue Intervention No. 1,2,3,4. **I:** - Monitor breathing pattern (frequency, depth, effort) - Monitor adventitious breath sounds (e.g., gurgling, wheezing, dry rales) and systemic factors (amount, color, odor) - Position in Semi-Fowler or Fowler position

	- Administer Simple Inhalation of Eucalyptus Oil Aromatherapy **E:** - Interventions are partially resolved **R:** - Interventions will be continued

Diagnosis	Day - 3
Ineffective Airway Clearance related to retained secretions (D.0001)	**S:** - The client's mother reports that the runny nose and productive cough are no longer present. An.M's airway clearance is effective. **O:** - Respiratory rate: 20 breaths per minute - No adventitious breath sounds detected - No sputum found **A:** - Ineffective Airway Clearance issue is resolved **P:** - Interventions are discontinued.

The objective of this implementation is to apply the use of simple inhalation with Eucalyptus Oil Aromatherapy for the health conditions of children experiencing Upper Respiratory Tract Infection (URI). The results of this implementation indicates an improvement in An.M's respiratory condition, with a reduction in cough and shortness of breath, as well as an enhancement in respiratory comfort, thereby supporting the effectiveness of aromatherapy in the management of URI in children.

Discussion

The results indicates that the client is experiencing ineffective airway clearance due to increased secretion production in the respiratory tract. Patients with impaired airway clearance often have difficulty mobilizing bronchial secretions, which impacts gas exchange and quality of life. The clinical manifestations present lead to the emergence of problems, one of which is ineffective airway clearance. Ineffective airway clearance is a condition in which an individual is unable to expel secretions from the respiratory tract to maintain airway patency (Diartin & Putri, 2024).

An assessment has been conducted on An.M, and based on the data analysis results, the diagnosis identified after the assessment of the client with Upper Respiratory Tract Infection (URI) is one diagnosis that emerged: Ineffective Airway Clearance (D. 0001) related to retained secretions. The nursing diagnosis is derived from the major and minor signs and symptoms as outlined in the SDKI (Indonesian Nursing Diagnosis Standards). Ineffective Airway Clearance refers to the inability to clear secretions or obstruction in the airway to maintain airway patency (Azzahra, 2025).

Complications that may arise from Acute Respiratory Tract Infection include paranasal sinusitis, Eustachian tube obstruction, and the spread of infection (Ners & Dinillah, n.d.). In this case study, the intervention planning is focused on administering simple inhalation using Eucalyptus Oil Aromatherapy to enhance ineffective airway clearance resulting from Upper

Respiratory Tract Infection (URI). Simple inhalation therapy can effectively address ineffective airway clearance (Suprapti, Astuti, & Anggarawati, 2024).

The administration of simple inhalation therapy with Eucalyptus Oil is an effective non-pharmacological approach to address ineffective airway clearance in Acute Respiratory Tract Infection (URI). The process of inhaling warm steam into the respiratory tract serves as a therapeutic method that can help improve the ineffectiveness of airway clearance (Anisah, 2025).

This study demonstrates that simple inhalation with Eucalyptus Oil plays a significant role in enhancing ineffective airway clearance. The use of Eucalyptus Oil as aromatherapy has proven effective in facilitating the mobilization of bronchial secretions, thereby improving respiratory function. Therefore, this inhalation method should be considered as an intervention in the management of respiratory disorders.

Conclusion

Based on the nursing care provided to An.M, a 5-year and 16-day-old child with Upper Respiratory Tract Infection (URI) from May 29 to May 31, 2025, at Dr. Euis Kusnawan Clinic, it can be concluded that the implementation of Eucalyptus Oil aromatherapy inhalation was successful. This therapy demonstrated an improvement in An.M's respiratory condition, with a reduction in cough and shortness of breath, as well as an enhancement in respiratory comfort, thereby supporting the effectiveness of aromatherapy in the management of URI in children. The use of simple inhalation as a therapy has benefits in alleviating respiratory issues due to its decongestant properties.

Based on the findings of this case study, it is recommended to conduct experimental research using a Randomized Controlled Trial (RCT) design to comprehensively evaluate the efficacy of eucalyptus oil aromatherapy inhalation in the management of upper respiratory tract infections (URTIs) in the pediatric population.

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Authors' contribution

Each author contributed equally in all the parts of the research. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Conflict of interest

The researchers stated that there is no conflict of interest related to the implementation and publication of the results of this research. The entire research process, from planning, data collection, analysis, to report preparation, was carried out independently without any influence or pressure from any third party. A commitment to research ethics is upheld throughout the research process, ensuring transparency, accuracy and honesty in reporting results. Respondents' participation was voluntary with informed consent, and their confidentiality and privacy were maintained in accordance with applicable research ethics standards. With this statement, researchers hope that the research results can be trusted and

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used as a valid reference for the development of science and health practices related to ethnomedicine and reproductive health.

Ethical consideration

Not applicable.

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