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Implementation of Chest Physiotherapy and Eucalyptus Aromatherapy On Oxygen Saturation and Airway Cleaning: Case Study

Afifah Afdiani Qurrokhmah[1], Eni Rahmawati[2]
[1]Program Profesi Ners, Faculty of Health Sciences, Jenderal Soedirman University, Purwokerto
[2]Department of Nursing, Faculty of Health Sciences, Jenderal Soedirman University, Purwokerto

ABSTRACT

Introduction: Pneumonia is a respiratory tract infection that attacks the lungs and usually affects children under five years of age. Management of children with pneumonia is one of them with supporting treatment. **Purpose:** Determine the effect of chest physiotherapy and eucalyptus aromatherapy on increasing oxygen saturation and airway clearance in pediatric patients with pneumonia. **Results:** An increase in oxygen saturation was already visible during the first intervention and airway clearance increased after the intervention was carried out on the second day. **Conclusion:** There is an increase in oxygen saturation and respiratory clearance after being given chest physiotherapy intervention and eucalyptus aromatherapy.

[1*] Correspondence Author :
Eni Rahmawati, Department of Nursing, Faculty of Health Sciences, Jenderal Soedirman University, Purwokerto.
eni.rahmawati@unsoed.ac.id

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INTRODUCTION

primary health care (PHC) is a health facility aimed at implementing community health efforts and individual health efforts at the first level by prioritizing health promotion and prevention efforts to achieve the highest degree of health in their working area (Permenkes RI, 2014).

Integrated Management of Childhood Illness (IMCI) is a form of service for sick toddlers managed for toddlers aged 2 months – 5 years (Rohayati et al., 2015). A preliminary survey conducted by researchers on November 4 2022 found that the largest case of IMCI visits in the last 10 months was pneumonia with a total of 158 visits and the peak in October 2022 was 28 pediatric patient visits to IMCI with pneumonia cases.

Pneumonia is an infectious disease of the respiratory tract that attacks the lungs due to bacteria or viruses and is a major cause of morbidity and mortality in children under five years of age, especially in developing countries (Rigustia et al., 2019). Management of pneumonia according to Marni (2014) is by administering antibiotics, vaccinations, and supporting treatment (oxygen administration, chest physiotherapy for expectoration, and administration of intravenous fluids to prevent dehydration).

Chest physiotherapy is a therapy to treat respiratory problems with the aim of helping remove secretions from the respiratory tract, strengthening respiratory muscles, and increasing gas exchange. The physiotherapy techniques applied to children are similar to adults consisting of postural drainage, clapping, vibration, percussion, deep breathing and effective coughing (Andersson et al 2019). Chest physiotherapy effectively mobilize tracheobronchial secretions in children with pneumonia as assessed on the basis of individual clinical parameters such as respiratory rate and oxygen saturation. Increased pulmonary secretions in pneumonia cause obstruction in the airways that interfere with ventilation. Ventilation disorders cause clinical manifestations in children, namely decreased oxygen saturation and increased respiratory rate (Abdelbasset, Walid and Elnegamy 2015).

Aromatherapy is a therapeutic action using

essential oils by inhalation. Eucalyptus oil is a type of essential oil produced by the Melaleuca leucadendra plant with the largest content being eucalyptol (cineole) which can provide mucolytic (thinning phlegm), bronchodilating (relieves breathing) and anti-inflammatory effects (Agustina, Auliyanti and Suharmiati 2017). Giving aromatherapy is an effective treatment for dealing with respiratory problems such as thinning secretions and keeping the respiratory tract moist (Mubarak, Indrawati and Susanto 2019).

Based on the description above, the authors are interested in implementing nursing in the form of chest physiotherapy and eucalyptus aromatherapy to increase oxygen saturation and airway clearance on a child with pneumonia in the working area of the PHC Baturraden II.

METHOD

This type of research is qualitative research with a descriptive case study approach compiled from nursing care reports using the nursing process by adapting the implementation of Evidence Based Nursing (EBN) in nursing practice beginning with a comprehensive assessment of patients. This case study consists of 5 stages. The first stage begins with questions presented referring to PICO (Problem/ population, intervention, comparison and outcome), namely "What interventions can be given to increase oxygen saturation and airway clearance in children with pneumonia?".

The second stage was the search stage using electronic media, namely the Google Scholar database with articles for 2015-2022 and obtained 454 articles that were in accordance with the research objectives. Followed by the third stage, an article review was conducted, it was found that chest physiotherapy and eucalyptus aromatherapy were nursing interventions that could be used. The fourth stage, the application of EBN in pediatric patients with pneumonia, begins with explaining the procedure to the patient and family and asking for approval before taking action. The fifth stage is an evaluation of chest physiotherapy interventions and eucalyptus aromatherapy.

RESULT

Case Report

A Child, age 4 years, woman with a weight of 20.4 kg and a lenght of 109 cm (normal Z score results) go to check IMCI room of PHC Baturraden 2 with complaints of cough, runny nose, runny consistency, dizzy, and had a fever for 3 days. The results of the examination obtained RR results: 48 x/minute and T : 36,7°C. From the results of the examination established a medical diagnosis pneumonia. The patient was then sent home and received ambroxol 3 drug therapy x1, amoxicillin trihydrate 3 x 1, and cetirizine 3 x 1.

Based on analysis of the data carried out obtained the problem of airway clearance nursing Ineffective (D.0149) related to retained secretions and breathing patterns Ineffective (D.0005) related to difficulty breathing (PPNI 2017).

Interventions given according to the diagnosis raised are: provide chest physiotherapy and airway management (eucalyptus inhalation therapy). The first intervention is chest physiotherapy, which is an action to mobilize airway secretions via percussion, vibration, and postural drainage. The purpose of chest physiotherapy intervention after nursing actions for 3 days it is expected that airway clearance will increase with the outcome criteria: effective cough, sputum production, and respiratory rate. The second intervention is road management breath (eucalyptus inhalation therapy) which is an action to manage patency airway. Goals of postoperative airway management interventions nursing for 3 days is expected to improve breathing patterns with the following criteria: nostril breathing, respiratory frequency, and respiratory depth (PPNI 2018).

Table Monitoring saturation Oxygen and Airway Clearance

First Day	
Morning	
Before Intervention	After Intervention
SpO2 : 98% Pulse : 97 RR : 46 x/ minute cleaning airway : Yes secret consistency viscous (sound voice crackles)	SpO2 : 99% Pulse : 60 RR : 44 x/ minute cleaning airway : Yes secret consistency viscous (sound voice crackles)
Afternoon	
Before Intervention	After Intervention

SpO2 : 98% Pulse: 108 x/ minute RR : 46 x/ minute cleaning airway : Yes secret consistency viscous (sound voice crackles)	SpO2 : 98% Pulse: 88 x/ minute RR : 42 x/ minute cleaning airway : Yes secret consistency viscous (sound voice crackles)
Second Day	
Morning	
Before Intervention	After Intervention
SpO2 : 98% Pulse: 98 x/ minute RR : 38 x/ minute cleaning airway : Yes secret consistency liquid (sound rhonchi reduced)	SpO2 : 97% Pulse: 99 x/ min RR: 35 x/ minute cleaning airway : None secret (voice rhonchi reduced)
Afternoon	
Before Intervention	After Intervention
SpO2 : 99% Pulse: 106 x/ minute RR : 28 x/ minute cleaning airway : No secretions (no crackles heard)	SpO2 : 99% Pulse: 63 x/ min RR : 27 x/ minute cleaning airway : None secret (no sound voice crackles)
Third Day	
Morning	
Before Intervention	After Intervention
SpO2 : 99% Pulse: 99 x/ min RR: 25 x/ minute cleaning airway : No secretions (no crackles heard)	SpO2 : 99% Pulse: 95 x/ minute RR : 23 x/ minute cleaning airway : None secret (no sound voice crackles)

Evaluation results of nursing interventions carried out for 3 days carried out in the morning and evening is an increase in airway clearance and pattern breathing improves with the criteria for an effective cough result of 2 (severely decreased) to 4 (moderately increased), sputum production 2 (moderately increased) to 4 (enough decreased), respiratory rate 2 (moderately worse) to 4 (moderately improved),
nostril breathing 2 (severely increased) to 4 (severely decreased), and Respiratory depth 2 (moderately worsening) to 4 (moderately improved). Criteria The success of the intervention in this case study was that there was an increase in levels oxygen saturation and airway clearance.

DISCUSSION

From the table above it can be seen that after being given chest physiotherapy and eucalyptus aromatherapy , namely respiratory status An. A underwent changes as seen from an increase in oxygen saturation, decreased pulse, decreased respiratory rate, and increased airway clearance.

Increase in oxygen saturation on average by 1%. The increase in oxygen saturation was already visible during the first intervention because the results before the intervention found that oxygen saturation levels were already in the normal range, namely 98%. so that the child's clinical condition is getting better.

This is supported by research conducted by Setyaji, Ilham & Pertiwi (2019) which states that chest physiotherapy affects the expectoration of secretions and increases O2 saturation in patients with chronic obstructive pulmonary disease.

Condition after done gift aroma therapy eucalyptus occurs enhancement effectiveness cleaning where is the breath ? exists diminished additional breath sounds , frequency _ cough reduced , and the viscosity of sputum is more watery .

These results are in accordance with the research of Anjani, SR & Wahyuningsih (2021) which states that the application of steam therapy with eucalyptus oil can help improve breathing, dilute secretions so that they come out more easily, and relieve pain in the throat. This is related to increasing airway clearance affecting oxygen saturation through improving the function of the body's organs back to normal.

New airway clearance increased after the intervention was carried out on the second day, marked by reduced crackles and sputum sounds that came out of the respiratory tract and came out together with coughing.

The results of the evaluation are in line with Hidayatin's research (2019) which explains that in the first chest physiotherapy intervention there was no change in airway clearance, but in subsequent interventions there were changes in airway clearance and very significant changes occurred in the second intervention (afternoon) on the second day . This is also supported by research by Tahir et al. (2019) who explained that the management of chest physiotherapy for ineffective airway clearance in COPD patients increases the patency of the airway which is also characterized by increased oxygen saturation due to the influence of clapping and vibration techniques.

On the second day of the intervention, it was also seen that sputum had begun to come out of the respiratory tract marked by the release of

mucus of a liquid consistency when the patient was inhaling eucalyptus vapor and the longer the steam was inhaled the easier it was to dilute the sputum as well as more mucus coming out of the respiratory tract.

The results of this evaluation are in line with the research of Anjani, SR & Wahyuningsih (2021) it was found that before steam therapy with eucalyptus oil 4 clients were unable to secrete secretions then after the therapy was carried out it was found that 3 clients experienced an increase in airway effectiveness and 1 client showed less increase in effectiveness airway clearance.

CONCLUSION

Implementation nursing given to An. A with pneumonia was found results there is enhancement saturation oxygen and cleaning jan breath after given intervention chest physiotherapy as well aroma therapy eucalyptus . The longer the intervention is carried out so will the more seen change in respiratory status . Chest physiotherapy helps stimulate sputum discharge and aromatherapy eucalyptus helps in dilution phlegm

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