

Effectiveness Of Peppermint Oil Aromatherapy Inhalation On Airway Clearance In Bronchitis Patients

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ABSTRACT

Bronchitis refers to inflammation or infection in the respiratory tract, exactly inside the bronchus. The inflammation makes mucous gland to be hyperplasia and hypertrophy. This situation makes ineffective airway clearance. One of the nursing care alternatives to manage this problem is - administering peppermint oil aromatherapy inhalation with menthol content as the decongestant. This research determined the effectiveness of peppermint aromatherapy inhalation in the ineffective airway clearance of bronchitis patients. This quantitative research applied a pre-experiment approach with accidental sampling. The samples were 32 respondents. The researchers collected the data with the observation sheet of respiratory tract clearance. The result of pre-administration of peppermint oil aromatherapy inhalation showed an ineffective airway clearance 75%. After the administration of peppermint oil aromatherapy inhalation, ineffective airway clearance became effective at 65.6%. The statistical result with marginal homogeneity test found the influence of peppermint oil aromatherapy inhalation toward the ineffective airway clearance of bronchitis patients with a p-value of 0.000. The results recommended the administration of peppermint oil aromatherapy as the nursing care intervention alternative to improve the ineffective airway clearance effectiveness of bronchitis patients.

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INTRODUCTION

Bronchitis is an inflammation or infection present in the respiratory tract that affects the bronchi, leading to changes (Ningrum et al., 2019). Changes in the bronchial walls involve the

destruction of elastic elements and smooth muscle of the bronchi (Djojodibroto, 2016). Bronchitis can be influenced by environmental factors with high levels of pollutants, such as smoking by family members at home, motor vehicle exhaust, smoke from burning

fuelwood during cooking, lack of influenza or pneumonia vaccination, frequent exposure to harmful substances, and a weakened immune system (Dary et al., 2018).

In 2021, the World Health Organization (WHO) reported that the global incidence of bronchitis was approximately 4.45%, affecting 12.1 million people out of an estimated population of 293 million. In Indonesia, around 1.6 million people were infected with bronchitis, with a 4% prevalence in males and a 6% mortality rate. The prevalence in females was 2%, with a 4% mortality rate. The average age of patients was above 45 years old (Windasari, 2018). According to the Ministry of Health of the Republic of Indonesia (2018), deaths due to Chronic Obstructive Pulmonary Disease (COPD), including asthma, bronchitis, and emphysema, ranked third among the top 10 causes of death in Indonesia.

In Central Java, bronchitis is identified as a major health issue. The prevalence of bronchitis in Central Java has fluctuated; in 2019, it was reported to be 36,720 cases, decreasing from 54,550 cases in 2018. However, in 2020, there was an increase to 43,182 cases. In 2021, the prevalence decreased again to 10,797 cases. Data from the Health Department of Semarang Regency shows that the incidence of bronchitis in Semarang Regency was 2,220 cases in 2020, increasing to 3,140 cases in 2021. At RSUD Gondo Suwarno Ungaran, the prevalence of bronchitis patients was 181 in 2021 and increased to 453 in 2022 (Medical Records RSUD Gondo Suwarno Ungaran, 2022).

Patients experiencing bronchitis often present symptoms such as coughing, audible wheezing during auscultation, shortness of breath, and the presence of sputum (Dary & Pajara, 2018). The excessive production of sputum in the lungs results in the accumulation of thick and difficult-to-expel phlegm or mucus (Anwari & Fatmawati, 2019). Disruption

in the clearance of this phlegm can lead to increased difficulty for patients in expectorating (Ningrum et al., 2019). Phlegm in the nose is challenging to expel, and a dry cough, followed by the emergence of white or yellow phlegm, occurs 1-2 days later. As the volume of phlegm increases, its color may change to yellow or green, indicating a chronic infection (Dary & Pajara, 2018).

Chronic infection is characterized by excessive sputum production and a decrease in ciliary clearance, ultimately leading to serious disruptions in gas exchange in the lungs (Djojodibroto, 2016). The airways become disturbed due to the excessive production and accumulation of secretions in the bronchi (Dary & Pajara, 2018). In cases of inflammation, mucous gland hyperplasia and hypertrophy typically occur, leading to increased secretion production and thickening of the bronchial walls, resulting in thickened sputum and ineffective airway clearance (Ningrum et al., 2019). Ineffective airway clearance, if not properly addressed, can lead to complications such as disrupted breathing patterns, hypoxia, or hypoxemia in bronchitis patients, necessitating prompt and appropriate nursing management (Misnardiarly, 2016).

Nursing management interventions for addressing ineffective airway clearance in bronchitis patients involve adhering to the OTEK principles (Observation, Therapeutic Measures, Education, Collaboration) (PPNI, 2018). Observational measures include monitoring breathing patterns, additional breath sounds, and sputum (Muttaqin, 2014). Therapeutic measures involve positioning the patient semi-Fowler or Fowler, providing warm fluids, performing chest physiotherapy, and administering inhalation therapy. Education includes advising effective cough techniques. The final step involves collaborative actions such as administering bronchodilators, expectorants, and mucolytics or inhalation therapy (PPNI, 2018).

Alternative inhalation therapy commonly used by

nurses to address ineffective airway clearance includes aromatherapy (Maula, 2016). Aromatherapy inhalation is a simple therapy involving inhaling steam released from a device. The inhalation therapy provided by the researcher utilizes a humidifier infused with peppermint oil. Peppermint oil inhalation therapy is employed to reduce coughing, decrease bronchial hyperactivity, thin mucus, and address infections and bronchospasms (Nurarif & Kusuma, 2015). This therapy can be administered when the symptoms are not too severe (Koensoemardiyah, 2019). According to research conducted by Juwita and Efriza (2018), peppermint oil aromatherapy has a significant impact on reducing respiratory frequency, improving effective coughing, and reducing sputum accumulation, with a p-value of 0.000, smaller than the α value of 0.05. The study by Amelia and Oktorina (2018) also showed a significant difference before and after the administration of peppermint oil aromatherapy, with a p-value of 0.002 (≤ 0.05), indicating an influence before and after the administration of peppermint oil aromatherapy.

Based on the phenomena observed at RSUD Gondo Suwarno regarding the administration of peppermint oil aromatherapy inhalation in bronchitis patients and observations of bronchitis patients, the average symptoms of coughing, shortness of breath, and difficulty in expelling sputum were noted. Therefore, this intervention becomes an alternative for addressing airway clearance in bronchitis patients. Inspired by previous research findings, the researcher is interested in studying the effectiveness of peppermint oil aromatherapy inhalation on airway clearance in bronchitis patients. The researcher chose to conduct the study at RSUD Gondo Suwarno Ungaran because the incidence of bronchitis in this hospital is relatively high, as evidenced by medical records from 2022, which showed 453 bronchitis patients treated. Furthermore, the preliminary study conducted by the researcher at RSUD Gondo

Suwarno Ungaran revealed that there had been no research conducted on peppermint oil aromatherapy in bronchitis patients at the hospital.

METHODS

This research employs a Pre-Experimental design, specifically utilizing a one-group pre-test and post test design. This design involves conducting a pre test (initial observation) before intervention, followed by the administration of the intervention, and then conducting a post-test (final observation) on the same individuals (Nurarif, 2015). The population in this study consists of all patients diagnosed with bronchitis at RSUD Gondo Suwarno Ungaran from January to December 2022. The sampling technique used by the researcher is accidental sampling, a method where respondents are selected based on their availability or presence in a particular location relevant to the research context (Sinuraya, 2017). Data collection will take place at RSUD Gondo Suwarno Ungaran from April 10 to May 10, 2023.

Data collection utilizes observation sheets to assess airway clearance, adopting a method from Wafiyah's research in 2019. The analysis employed in this study is univariate analysis. Univariate analysis aims to explain or describe the characteristics of each research variable (Widodo, 2017). In this research, the variables described include age, gender, duration of illness, occupation, and airway clearance, presented in the form of a frequency distribution table.

Bivariate analysis is conducted using the Marginal Homogeneity test to measure and examine two related or paired samples with ordinal or interval scale conditions, and one sample is measured twice. The steps for conducting the Stuart-Maxwell Marginal Homogeneity test involve first grouping the variables before and after the intervention. Subsequently, the decision on the hypothesis can be observed in the statistical table's asymp sig section. If the p-value interpretation is less than 0.05, it indicates effectiveness, while a p-value greater than 0.05 suggests ineffectiveness.

RESULT AND DISCUSSION

1. Respondent Characteristics

Based on Table 4.1, it is known that the majority of respondents fall within the age range of 45 - 46 years, comprising 21 (65.6%) respondents. The gender characteristics in the table indicate that the majority of respondents are male, totaling 20 (62.5%) respondents. The table on the duration of suffering shows that respondents who have been suffering from bronchitis for the longest period fall within the 3 - 7 year range, with a total of 16 (50.0%) respondents. In terms of occupation frequency, most bronchitis patients work as laborers, with a total of 11 (34.4%) respondents.

Individuals aged 45 - 65 years generally have weakened immune systems due to higher activity levels compared to other age groups, affecting one's antibodies. As age increases, the weakening of antibodies also increases, making one more susceptible to infections (Sianturi, 2014). The aging process can cause structural changes in the lower respiratory tract, resulting in a decline in lung function. Increased lung effort and a decrease in alveolar wall tissue can lead to decreased lung function. Meanwhile, in the upper respiratory tract, cilia movements become slow and less effective, making the aging process vulnerable to respiratory infections (Ikawati, 2020).

Men are often affected by bronchitis due to smoking habits, genetic factors, and air pollution. Smoking has various effects on the respiratory system. Carbon monoxide competes with oxygen for hemoglobin molecules, reducing oxygen-carrying capacity (Haryono, 2020). Smoking can also increase inflammatory responses. The inflammatory process contributes to

physiological changes, such as increased sputum production. Therefore, men are more at risk of developing bronchitis (Francis, 2017).

On average, bronchitis sufferers experience the condition for 3 - 7 years due to other factors such as smoking habits, environmental factors, and genetic factors (Mustika, 2020). Serious bronchitis patients may have this condition throughout their lives. However, some manage to recover when they quit smoking. Bronchitis can be cured if the person stops smoking, adopts a healthy lifestyle, and receives proper medical treatment (Runiari, 2018).

Factory workers, including those in the occupation of laborer, are listed among the 10 - 20% of deaths caused by respiratory problems, especially in environments that generate a lot of dust, such as factory settings (Simoes et al, 2018). Air exposure in factories is estimated to cause 386,000 deaths and nearly 6.6 million years. Regarding exposure to cotton dust, chest tightness is the most common respiratory symptom (20.3%) (Sylvia, 2017). Occupational factors are associated with the occurrence of bronchitis.

2. Airway Clearance Before and After Peppermint Oil Aromatherapy Inhalation

Table 4.2 shows airway clearance before receiving peppermint oil aromatherapy inhalation; the majority of respondents experienced ineffective airway clearance, with 24 respondents (75%). Meanwhile, in the table after receiving peppermint oil aromatherapy inhalation, the majority of respondents experienced a change to effective airway clearance, with 21 respondents (65.6%).

Ningrum (2019) states that peppermint oil is effective in thinning mucus, making it disappear more quickly. In addition, inhalation of peppermint oil aromatherapy also makes

patients with ineffective airway clearance feel less discomfort when expelling mucus. Peppermint oil aromatherapy inhalation is effective in terms of airway clearance indicators, such as a decrease in sputum production and additional sound indicators like wheezing, as it has expectorant properties.

3. Effectiveness of Airway Clearance Before and After Peppermint Oil Aromatherapy in Bronchitis Patients

Table 4.3 shows airway clearance before receiving peppermint oil aromatherapy inhalation with a mean score of 2.75. Meanwhile, airway clearance after receiving peppermint oil aromatherapy inhalation has a mean score of 1.47. Based on the analysis using the Marginal Homogeneity test, a p - value of 0.000 (<0.05) is obtained, indicating that the alternative hypothesis (H_a) is accepted, demonstrating significant effectiveness between before and after the administration of peppermint oil aromatherapy inhalation on airway clearance in bronchitis patients.

Simple inhalation involves inhaling the warm steam from boiling water mixed with aromatherapy, such as peppermint oil. The essential content found in peppermint oil is menthol. The composition of peppermint oil consists of 78% menthol, 2% mixed menthol esters, 1% essential oil, and the rest are resin, tannin, and acetic acid. The essential content in peppermint oil has effects as antibacterial, antiviral, expectorant, and vasodilator (Tjitrosoepomo, 2013). Peppermint oil has a decongestant effect to reduce coughing, decrease bronchial hyperactivity, thin mucus, and address infections and bronchospasms (Siswantoro, 2015).

Based on this research and previous studies, it can be concluded that peppermint oil aromatherapy inhalation is effective in airway clearance for bronchitis patients, as

evidenced by airway clearance indicators: the irregular breathing frequency of patients becoming regular, a reduction in dominant coughing in bronchitis patients, a decrease in additional respiratory sounds (wheezing), a decrease in sputum production, and a reduction in restlessness observed in patients.

CONCLUSION

Conclusion

The frequency analysis of airway clearance before receiving peppermint oil aromatherapy inhalation shows ineffective results, with a frequency of 24 (75%). Subsequently, the frequency analysis of airway clearance after receiving peppermint oil aromatherapy inhalation shows effective results, with a frequency of 21 (65.6%). The analysis results indicate that the administration of peppermint oil aromatherapy inhalation is effective for airway clearance in bronchitis patients, with a p-value of 0.000.

Recommendation

Recommendations for healthcare services: The results of this study indicate that peppermint oil aromatherapy inhalation is effective in airway clearance for bronchitis patients. Therefore, RSUD Gondo Suwarno Ungaran may consider incorporating peppermint oil aromatherapy inhalation nursing interventions as an alternative to help address airway clearance in bronchitis patients. Recommendations for educational institutions: The findings of this study can be utilized as Evidence-Based Research on peppermint oil aromatherapy inhalation for airway clearance in bronchitis patients. Recommendations for future research: The results of this study can serve as a reference and input for future research, incorporating different variables, a larger number of respondents, the addition of a control group, and consideration of factors influencing airway clearance, such as medications, genetic factors, and nebulizer therapy. These adjustments can enhance the robustness of future research findings.

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Table 4.1
Frequency Distribution of Respondent Characteristics at RSUD Gondo Suwarno Ungaran
(April - May 2023) (n=32)

Respondent Characteristics	f	%
Age		
15-24 age	2	6,3
25-44 age	2	6,3
45-65 age	21	65,6
>65 age	7	21,8
Gender		
Men	20	62,5
Women	12	37,5
Duration of Suffering		
<3 year	5	15,6
3-7 year	16	50,0
>7 year	11	34,4
Job		
Unemployed	7	21,8
Labor	11	34,4
Private company employee	4	12,5
TNI/PNS/Polri	6	18,8
Trader	4	12,5
Total	32	100

Table 4.2
Frequency Distribution of Airway Clearance Before and After Peppermint Oil Aromatherapy Inhalation in
Bronchitis Patients at RSUD Gondo Suwarno Ungaran, April - May 2023. (n=32)

	Description	Pretest		Posttest	
		f	%	f	%
Airway Clearance	Effective	0	0	21	65,5
	Quite Effective	8	25	7	21,9
	Not Effective	24	75	4	12,5
	Total	32	100	32	100

Table 4.3

The Effectiveness of Airway Clearance Before and After Peppermint Oil Aromatherapy in Bronchitis Patients at RSUD Gondo S uwarno Ungaran (April - May 2023)

Airway Clearance	Mean		ρ value
	Before	After	
	2,75	1,47	0,000