

Original Articles: Case Study

APPLICATION OF SIMPLE INHALATION THERAPY IN PULMONARY TB PATIENTS TO OVERCOME THE INEFFECTIVENESS OF BREATH WAY CLEANING

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Abstract

Background: Inadequate airway clearance is one of the nursing issues that arises during the pulmonary tuberculosis disease process. If untreated, ineffective airway clearance can result in hypoxemia, decreased consciousness, and even cell death.

Objective: The purpose of this study is to see that simple inhalation therapy can help pulmonary tuberculosis patients at the Banyu Urip Community Health Center to overcome ineffective airway clearance.

Methods: The research methodology combines a case study approach with a family nursing process approach, with one case as the unit of analysis, Mrs. K, a pulmonary tuberculosis patient who get treatment at the Banyu Urip Community Health Center working area. Data was gathered through interviews, physical examinations, supporting examinations, and a literature review. In the study, 350 ml of hot water steam and 5 drops of eucalyptus oil were applied twice a day for three days, for 10-15 minutes.

Result: The research results of simple inhalation therapy proved to have a positive effect on Mrs. K, as evidenced by a reduction in verbal complaints, including ease in driving out secretions, respiratory frequency was within normal limits, and breathing became easier, because the cineol content of eucalyptus oil has mucolytic, bronchodilator, and anti-inflammatory functions.

Conclusion: To overcome airway ineffectiveness and improve health status, simple inhalation therapy combined with eucalyptus oil can be used as an alternative. Non-pharmacological techniques that are simple, easy to use but provide numerous benefits in health care facilities, such as simple inhalation therapy, are expected of health care workers.

INTRODUCTION

Pulmonary tuberculosis is a chronic infectious disease with a long-term treatment process that causes physical impacts, one of which is ineffective airway clearance. This condition can cause sufferers to have difficulty carrying out daily activities, carrying out their roles and responsibilities towards their family (Abilowo & Lubis, 2022; Somantri, 2007). Judging from the type of disease and complications caused, pulmonary tuberculosis can have a negative impact on sufferers and family members who do not

suffer from pulmonary tuberculosis. Family influence includes physical, psychological and social aspects. In overcoming these health problems, the role of health nurses is to provide family nursing care to prevent further complications. Family nursing is considered unique because the service process is provided as a whole to family members as a system that influences each other.

The World Health Organization (WHO) reports that the estimated number of people diagnosed with Tuberculosis in 2021 globally is 10.6 million cases, an increase of around 600,000 cases from 2020. Based on the 2022 Global TB Report, Indonesia ranks second in the world for the burden of Tuberculosis cases. the highest, namely with a total of 969,000 cases and 93 thousand deaths per year or the equivalent of 11 deaths per hour. Data from the East Java Provincial Health Service in 2021 compiled by BPS shows that Surabaya is in first place with 4,475 cases out of 41,531 of the total cases in East Java. This figure will increase to 81,753 in 2022, with the highest number of cases in Surabaya, namely 10,741 cases. The incidence of pulmonary tuberculosis cases in the Banyu Urip Community Health Center working area in 2021 was 150 new cases. In the first quarter of 2023 (January-March), the total number of new cases will be 31 people (18 cases in January, 6 cases in February and 7 cases in March). From the data above, it shows that case detection in the Banyu Urip Community Health Center working area experienced fluctuations in the first quarter of 2023, however, control of Tuberculosis cases was still carried out optimally to improve the health status of individuals in the community.

According to Brunner & Suddarht (2015) Pulmonary tuberculosis is a world health problem that is closely related to poverty, malnutrition, population density and inadequate service facilities (Abilowo & Lubis, 2022). Patients are also vulnerable to experiencing a crisis of self-confidence due to the conditions they are experiencing; most pulmonary tuberculosis patients experience boredom in the treatment process which is closely related to the activity of taking long-term medication and the possibility of high transmission. Complaints and symptoms caused by TB germs (*Mycobacterium tuberculosis*) include fever, cough, shortness of breath, chest pain and malaise (found in the form of anorexia, decreased appetite, decreased body weight, headaches, muscle aches and night sweats) (Ministry RI Health, 2020; Somantri, 2007).

The main complaint that often arises in pulmonary tuberculosis patients is ineffective airway clearance. This problem was raised because the patient's inability to overcome airway obstruction was still quite high and considered trivial. Blockage occurs due to the accumulation of sputum in the respiratory area caused by the entry of bacteria, which damages the lung area and causes an inflammatory reaction, namely excess sputum production. As a result of ineffective airway clearance, oxygen supply in the body is hampered, resulting in the body experiencing hypoxemia, decreased consciousness and cell death if left untreated. Airway clearance is an important component that serves as the main route for the air circulation process in the body because maintaining the continuity of cell metabolism requires adequate respiratory function (Azari & Metasari, 2023; Rahmawati, 2017). In order oxygen supply in the body to be met, the patient needs help to expel secretions so that airway clearance is effective again.

One effort to overcome this problem is by inhaling or inhaling medication. Simple inhalation can be combined with eucalyptus oil as a warming mixture. Eucalyptus oil has antimicrobial effects against many bacteria, including *Mycobacterium tuberculosis* (Sadlon & Lamson, 2010a). Simple inhalation is made with affordable ingredients and simple methods and can be applied in the family environment either with or without medication (Dewi & Oktavia, 2021). Family nursing care plays an important role in creating a healthy life in the family environment. In health services, such as cases of pulmonary tuberculosis, the involvement of the family as the person closest to the patient cannot be separated, because health problems experienced by one family member can affect other family members. This is because families have a duty to care for the health of their family members, namely recognizing the health problems they are suffering from, making decisions to carry out appropriate treatment measures, providing care to sick family members and maintaining a home environment that is conducive to health.

METHODS

Study Design

The research design used in this scientific work is a case study using a nursing care approach. This scientific work is a single case study, the selected case is actual with the nursing problem of ineffectiveness of airway clearance with simple inhalation actions.

Settings

This research was conducted in the Working Area of the Banyu Urip Public Health Center in Surabaya and the time of the research was carried out on February 27-April 2 2023. The selection of location and time was carried out at the same time as the researcher carried out Community and Family Nursing Practice.

Research subject

The subject in this study was Mrs. K aged 64 years with a medical diagnosis of pulmonary tuberculosis with nursing problems of ineffective airway clearance.

Instruments

This study used observation instruments of Nursing Care Process that conducted by Faculty of Nursing and Midwifery, University of Nahdlatul Ulama Surabaya.

Data collection

The research instrument used a variety of methods to collect data, including observation, interviews, physical examination (head to toe), and literature study by studying books and journals to serve as theoretical guidelines.

Data Analysis

The data analysis used in this study is descriptive analysis based on data in the format of nursing care.

Ethical Consideration

In this study, the researcher submitted a permit application to the Banyu Urip Public Health Center to conduct research at that location by bringing an application permit from the University of Nahdlatul Ulama Surabaya (which coincided with the Community and Family Nursing practice taking place in the Work Area of the Banyu Urip Public Health Center). While the research subjects were given informed consent prior to family nursing care.

RESULTS

Description of family nursing care in cases of ineffective airway clearance in Mrs. K by applying simple inhalation therapy to overcome the problem of excess secretion buildup. Based on the data obtained, Mrs. K with pulmonary TB said he was coughing and felt like he had phlegm in his throat but it was hard to get out. Objective data obtained include the patient appearing to be coughing but no phlegm coming out, additional breath sounds heard during auscultation of the lungs in the right lobe of ribs 1-4 midclavicular, no visible nostril breathing and no visible use of accessory muscles for breathing, with Initial vital signs examination: blood pressure 130/85 mmHg, pulse: 82 x/minute, RR: 21 x/minute, temperature: 36.0C. Anthropometry : BB (February 2023): 55 Kg, BB (March 2023) : 53 Kg, TB : 156 cm, LILA : 23.5 cm, BMI : 21.8 kg/m² (normal BB, 18.5-24, 9). Biochemistry: (-) the patient has no laboratory examination. Clinical sign: there has been a decrease in weight in the last 1 month. Hair that falls out easily tends to be oily. Vision function decreases (due to age). Diet: Eat 1-2 times/day (side dishes, rice) ¼ portion without finishing, drink ± 1 L/day of water. Condition of Mrs. K house is poorly maintained and a little stuffy, it is difficult for sunlight to enter the house, the occupants of the house are crowded together (5 people in one house) and the condition of the house environment is densely populated.

In the study Mrs. K found complaints and symptoms that were typical and in accordance with Hannah's (2021) theory, namely that symptoms caused by pulmonary TB patients included coughing, decreased appetite and weight loss. Condition of Mrs. K house that is poorly maintained and a bit stuffy, sunlight is difficult to enter the house, the occupants of the house are crowded together (5 people in 1 house) and the condition of the home environment which is densely populated, further increases the risk factors for the development of TB disease in the patient's family environment (Abilowo & Lubis, 2022).

After carrying out the assessment, the nursing diagnosis of ineffective airway clearance was found to be related to the family's inability to care for family members with the problem of excess secretion buildup, and scoring was carried out and the score was 2 1/3 highest compared to other diagnoses. This was raised as the main problem because it was considered the most important and disturbing, apart from that, airway clearance is an important component in the air circulation process in the body. Blockage occurs due to the accumulation of sputum in the respiratory area caused by the entry of bacteria, which damages the lung area and causes an inflammatory reaction, namely excess sputum production. As a result of ineffective airway clearance, oxygen supply in the body is hampered, resulting

in the body experiencing hypoxemia, decreased consciousness and cell death if left untreated (Azari & Metasari, 2023; Rahmawati, 2017)

Followed by implementing nursing interventions that are appropriate to the patient's condition in the hope that general criteria and specific criteria (TUK 1 to 5) are achieved. The intervention carried out was simple inhalation therapy. Simple inhalation therapy was chosen because it is made with simple materials and methods and can be done in a family environment. Inhalation can be done with or without medication (Dewi & Oktavia, 2021; Handayani et al., 2022). Apart from being effective in overcoming airway clearance problems, it is easy to apply to patients, the materials used are also affordable.

After simple inhalation therapy was carried out at the first meeting (21 March 2023) Mrs. K said the throat felt looser/relieved. Mrs. K and his family seemed enthusiastic about the techniques being taught, as evidenced by the response of patients and families who wanted to know more about simple inhalation. In line with the theory which states that simple inhalation can remove blockages such as phlegm or mucus in the respiratory tract such as coughs, mild flu, bronchitis, pneumonia and various other conditions of ineffective airway clearance (Rahmah, 2021).

At the second meeting (22 March 2023), Mrs. K said he was able to do simple inhalation therapy himself at home, by checking the vital signs which were also getting better, namely the breathing frequency improved (scale 5) from initially 21x/minute to 18x/minute, effective coughing increased quite a bit (scale 4), production sputum decreased (scale 5), the patient was seen to be able to expel phlegm without difficulty, the additional sound of crackles was reduced (scale 4) than before. This condition occurs because inhaling the steam produced from hot water and the combination of eucalyptus essential oil will provide a stimulus to the olfactory receptors and transmit it to the emotional center in the brain or limbic system so that it can regulate breathing patterns to be more relaxed (Arini & Syarli, 2022). The results of the nursing evaluation can be concluded that simple inhalation therapy is able to overcome the ineffectiveness of airway clearance in pulmonary TB patients.

DISCUSSION

In this final scientific work, the author focuses on carrying out therapeutic implementation in overcoming the nursing problem of ineffective airway clearance in Mrs. K is providing simple inhalation therapy. The implementation of simple inhalation therapy is guided by the author with the initial steps of preparing the patient: 1) the patient is informed regarding the action to be carried out; and 2) the patient is in a sitting position. The second phase is environmental preparation: 1) preparing a quiet room; and 2) providing a clean room, sufficient ventilation and lighting. The third phase is preparing the equipment, help the patient provide: 1) a bathtub containing hot water; 2) prepare the necessary breath relief/aromatherapy medicine such as eucalyptus oil; and 3) a large towel/wide cloth. The fourth phase is implementation: 1) give the shoulder a towel or wide cloth so that the client does not get cold; 2) prepare a cup containing hot water, mix eucalyptus oil in a ratio of 5 drops of eucalyptus oil to 350 ml of hot water, and cover the client's head with a towel so that the steam does not escape; 3) recommend

carrying out the procedure in a closed room so that the steam does not mix with the free air; 4) encourage the client to take a breath, close the eyes (so the eyes don't sting) while inhaling the hot water steam; 5) if there is no towel, use a funnel/cone made of cardboard then direct the funnel/cone only at the client's mouth and nose when inhaling the steam, with the bottom of the cardboard covering the basin; 6) do this for 10-15 minutes, 2 times a day; and 7) after completing the action, clean the equipment. Lastly, evaluate the client's verbal response related to breathing and evaluate the client's non-verbal response including breathing difficulties/obstacles, respiratory frequency and facial expressions.

Response Mrs. After giving a simple inhalation, K felt loose/relieved in the throat. This is in line with research by Dornis et al in the Zulnely publication which states that eucalyptus essential oil can be used as a herbal medicine to relieve coughs, shortness of breath due to flu or asthma by rubbing it on the chest, treating sinuses by inhaling warm steam infused with eucalyptus oil, and relieve nasal congestion by inhaling the aroma (Agustina & Suharmiati, 2017; Dewi & Oktavia, 2021; Zulnely et al., 2015).

Changes in vital signs, which include improvements in respiratory frequency, decreased sputum production, reduced rhonchi sounds and easier expulsion of phlegm, occur because inhaling steam produced from hot water and a combination of eucalyptus essential oil will provide a stimulus to the olfactory receptors and transmit it to the emotional center in the brain or limbic system so that it can regulate breathing patterns to be more relaxed (Arini & Syarli, 2022).

When implementing the simple inhalation technique, the family seemed enthusiastic because they finally knew there were simple things the family could do to help overcome the health problems of their family members. In accordance with the statement of Nawang Sari et al. (2021) simple inhalation is made with affordable ingredients and simple methods and can be applied in the family environment because it can be done with or without medication, making it easier for ordinary people.

The response from the family shown through enthusiasm also fits with the theory which states that the family has a duty to maintain the health of its family members, both in recognizing the health problems they are suffering, making decisions to carry out appropriate treatment measures, providing care to sick family members and maintaining the environment. a home that is conducive to health. Health problems that arise in individuals can have a negative impact on themselves and their families (Eka & Trina, 2021).

LIMITATION

In preparing this Final Scientific Work, there were several limitations that the author experienced, namely the meeting schedule with the family adjusted to the author's work schedule at work and the ongoing Community and Family practice site.

CONCLUSION

The application of simple inhalation therapy in the implementation of family nursing actions obtained good results so that it was achieved according to the target, this was realized due to collaboration

and coordination with health workers at the Banyu Urip Public Health Center such as TB program holders in administering drugs, taking masks/additional food and other routine checks. At the end of the treatment evaluation, the problem can be resolved even though it is not fully maximized, but the client still shows progress in improving his illness. In general, family nursing care for pulmonary TB patients is to provide conservative measures to help families change bad lifestyles to be good and maintain good habits so that they become even better, especially in pulmonary TB problems. For the development of nursing science, always improve insight and knowledge of family nursing care regarding innovations from simple therapeutic therapies that have many benefits, and can apply the knowledge gained both within the family and health facilities.

Health care workers, especially nurses and those in charge of the pulmonary TB program, are expected to make routine home visits to pulmonary TB patients to monitor how to take medication, remind them when to take drugs and clean the home environment to prevent transmission to other family members. The purpose of this visit is as a form of attention to clients and families in order to improve healing (motivation) so that it can break the chain of transmission of pulmonary TB disease. Apart from that, efforts are needed to make IEC/ health promotion facilities that can be utilized by both Public Health Center staff and clients, such as leaflets/ brochures/ posters and so on. And if possible, the health center can hold new programs such as regular outreach about simple complementary therapies such as simple inhalation techniques that can be applied in the family/ community environment to treat symptoms and effects that arise as a result of the course of pulmonary TB disease.

AUTHOR CONTRIBUTION

Dini Firdiana Putri: Literature review, conceptualization, methodology, carrying out the nursing process, and preparing the manuscript.

Umdatul Soleha: Literature review, conceptualization, methodology, and manuscript preparation.

Firdaus: Literature review, conceptualization, methodology, supervision, and manuscript preparation.

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CONFLICT OF INTEREST

There is no conflict of interest in this study.

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