



Deep Breathing and Coughing Techniques are Effective for Airway Clearance in Patients with Pulmonary Tuberculosis

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ABSTRACT: Tuberculosis is a public health problem throughout the world. Mortality and morbidity rates of tuberculosis continue to rise. This study aims to determine the effectiveness of deep breathing and effective coughing technique against airway clearance in patients with pulmonary tuberculosis. This research is a Quasi Experiment with the design of the study one group pretest posttest held in one of the hospitals in the city of Padang. Samples taken as many as 12 people. The data collection is done by observation. Univariate data analysis performed using descriptive statistics and bivariate analysis with statistical paired t-test. The results of this study 33.3% of patients with pulmonary tuberculosis with the deep breathing that is not good, 33.3% of patients with pulmonary tuberculosis with cough ineffective, 100% of patients with pulmonary tuberculosis with airway clearance were not clean before the deep breathing and effective cough techniques, 33.3% of patients with pulmonary tuberculosis with airway clearance were not clean after the deep breathing and effective coughing techniques, there is influence of deep breathing and coughing techniques against airway clearance in patients with pulmonary tuberculosis. This study shows that there is influence of deep breathing and effective cough techniques against airway clearance in patients with pulmonary tuberculosis. Through leader the hospital, is expected to increase patient motivation in doing deep breathing and coughing techniques in accordance with Standard Operating Procedures (SOP).

KEYWORDS: airway clearance, deep breathing, effective coughing, Tuberculosis

INTRODUCTION

Tuberculosis (TB) is an infectious disease, which primarily affects the lung parenchyma. Tuberculosis can also be transmitted to other body parts, including the meninges, kidneys, bones, and lymph nodes. The main infectious agent of tuberculosis is *Mycobacterium tuberculosis*, is acid-resistant aerobic rods that grow slowly and are sensitive to heat and ultraviolet rays (Smeltzer & Bare, 2013).

Tuberculosis is a public health problem throughout the world. Mortality and morbidity rates of tuberculosis continue to rise. Tuberculosis is closely associated with poverty, malnutrition, shantytowns, substandard housing, and health care inadequate (Smeltzer & Bare, 2013). Most of that is about 95% of cases of tuberculosis causing death and 98% incidence of tuberculosis occurred in countries that are developing. Among those suffering from tuberculosis, 75% are in the productive age 20-49 years. This is because a large population and the prevalence of tuberculosis patients that is more than 65% of cases of tuberculosis were new and which caused the death of tuberculosis cases occur in Asia (Sudoyo, 2016). Indonesia is a country with a prevalence of tuberculosis 3rd highest in the world after China and India. In 2010 an estimated 1.828 million cases of tuberculosis in China, India and Indonesia 1.414 million cases of 591,000 cases. Estimates of the incidence of smear-positive cases in Indonesia is 266 000. The latest national prevalence of pulmonary tuberculosis patients in Indonesia is estimated to 0.24% (Sudoyo, 2016).

The clinical picture of tuberculosis may not appear on the initial infection, and it may never arise if there is no active infection. If you develop an active infection, patients usually show symptoms such as fever which occurred in the morning, greenish sputum, malaise, night sweats, loss of appetite and weight loss. Pulmonary tuberculosis including Insidious. Initially nonproductive cough can evolve toward the formation of sputum mukopurulen with hemoptysis (Smeltzer & Bare, 2013).

The entry of tuberculosis germs that infect the lower respiratory tract lead to a productive cough and coughing up blood. Then there will be a decrease in the function of cilia, which can lead to accumulation of secretions in the respiratory tract. Accumulation of secretions in the respiratory tract will cause inflammation in the airway, when there is inflammation there will be a secondary



infection. This secondary infections would lead to sputum cannot be excluded. If sputum cannot be removed it will disrupt airway clearance (Sudoyo, 2016).

In patients with pulmonary tuberculosis with impaired airway due to accumulation of sputum in the airway usually feel shortness of breath, the additional breath sounds, dyspnea, cyanosis, and needs a rest / sleep disturbed. Increased airway clearance is one of the effective ways that can be performed in patients with pulmonary tuberculosis, due to the secretion can clog the airway in many tuberculosis patients and disrupt effective gas exchange. Increase fluid intake provides systemic hydration and serves as an effective expectorant. Pulmonary tuberculosis patients also explained about the best position you can do to facilitate drainage. Humidifier or a facial mask with high humidity can help thin the secretions (Smeltzer & Bare, 2013).

Efforts that can be made to treat airway clearance is ineffective by providing technical action deep breathing relaxation and effective coughing for help clients expel phlegm, because this relaxation technique where the client can save energy so the client doesn't easily tired and can produce phlegm maximally (Apriyadi, 2013).

The results of another study conducted by the Marwono & Sasono (2013), states that by increasing the effective cough and lower mobility will be achieved clearance of airway especially in patients who experience a buildup of secretions in the airways and impaired the efficiency of the entry of air into the lungs. Effective cough is an effective method to do on pulmonary tuberculosis patients with impaired airway due to accumulation of secretions the airway, because with this effective cough clients can save energy so it does not get tired easily and can be optimally remove sputum (Sudiryo, 2008). The results of this study show that studies case exists increase in secretions clients with pulmonary tuberculosis who got physiotherapy and cough effective so that client capable maintain the airway effective (Sitorus, 2013).

METHOD

The research was done by using quasi experiment with the design of the study one group pretest posttest. The study design uses only one experimental group and there was no comparison group or the control group. However, this study did the first observation (pretest) that allows testing the changes that occur subsequent to the act or experiment (posttest). This research was conducted in Ward Lung Hospital Dr. M. Djamil Padang with the population is the entire of patients with pulmonary tuberculosis with impaired airway treated in Ward Lung Hospital Dr. M. Djamil Padang the determination of the number of samples in this study is by using Accidental Sampling is sampling conducted shortly, so that the samples obtained are samples available at the time the study is for two weeks. Samples taken must comply with the following inclusion criteria, Pulmonary tuberculosis patients who experience a buildup of sputum airway, Located at the time of the study, Patients willing to be investigated. Analysis of the data used in this study was univariate and bivariate analysis. Univariate analysis performed using descriptive statistics and bivariate analyzes were performed using parametric statistical tests paired t-test (dependent t test) with a significance level of 95% ($\alpha = 0.05$).

RESULT

Table 1. Frequency Distribution of Airway in Tuberculosis Respondents' Before Deep Breathing and Coughing Effective

No	Airway Clearance Before	<i>f</i>	%
1	Not Clean	12	100
2	Clean	0	0,0
	Total	12	100

Based on table 1 it explains that all respondents (100%) experienced unclean airway clearance before deep breathing and effective coughing techniques were carried out

Table 2. Frequency Distribution of Respondents' Airway Clearance After Deep Breathing and Effective Cough Techniques

No	Airway Clearance After	<i>f</i>	%
1	Not Clean	3	25
2	Clean	9	75
	Total	12	100



Table 2, explains that more than half of the respondents (75%) experienced good airway clearance after deep breathing and effective coughing techniques.

Table 3. Frequency Distribution of Airway Clearance in Tuberculosis Patients After Deep Breathing and Effective Cough Techniques

Variable	N	Mean	SD	p Value
Effect of deep breathing and effective coughing techniques against airway clearance in patients with pulmonary tuberculosis	12	5,00	0,000	0,001
	12	0,83	1,329	

Table 4 shows that the average patient's airway clearance before being given deep breathing and effective coughing techniques was 5.00 with a standard deviation of 0.000. Meanwhile, after being given deep breathing and effective coughing techniques, an average of 0.83 was obtained with a standard deviation of 1.329. Further statistical test results show that there is an effect between deep breathing technique and effectiveness with airway clearance in tuberculosis patients with a p value of 0.001

DISCUSSION

Effective coughing exercises are activities performed to clean secretions in the airways. The goal of an effective cough is to increase mobilization secretions and prevent the high risk of retention of secretions (Muttaqin, 2008). with athe method that teaches the correct coughing technique is expected by the patient save energy so you don't get tired easily and can expel phlegm quickly maximum (Mubarak, Indrawati, & Susanto, 2015).

Based on the results that less than half of patients with pulmonary tuberculosis with the breath technique that is not good. Which states that the implementation of deep breathing techniques are ineffective can cause retention of sputum, airway obstruction, infection and respiratory failure (Junith & Nancy, 2013). A deep breath is inhaling slowly through your nose and exhale through lips pressed together. Technique of deep breathing that aims to clear breathing and clear the airway of foreign objects contained in the airway can be done anytime, but the implementation of a routine that can be performed by a person with pulmonary tuberculosis with impaired airway due to accumulation of sputum on the airway is before meals and at bedtime (Smeltzer & Bare, 2013).

Cough is an effective way to clean out foreign matter or secret and respiratory tract (Price, 2014). Effective cough is an effort in removing sputum which prior to the effective cough must first take a deep breath (Smeltzer & Bare, 2013). Coughing serves to cleanse the respiratory tract of a secret (in the form of mucus), necrotic materials, foreign objects, and so on. This reflex can also be caused by a variety of stimuli to the mucosa of the respiratory tract and also of stimulation to the pleura parietas (Kemenkes RI, 2011).

Exercise effective cough serves to remove secretions. Exercise effective cough is very beneficial for tuberculosis patients with impaired airway to remove mucus or secretions in the airway. Coughing exercises that can be done is to sit down with slightly bow. Ask the patient breathed deeply and hold and contract your abdominal muscles. Blow breath stronger and coughing. Usually it has to done 2 to 4 times before meals and at bedtime or night break (Potter & Perry, 2014).

Cleanse the patient's breath after being given deep breathing and effective coughing therapy

In this study, there were still 3 (25%) pulmonary TB patients with unclean airways after deep breathing and effective coughing techniques. According to Rishi, 2009 ineffective airway clearance is the inability to clean secretions or airway obstruction maintain a clear airway. Ineffective airway clearance is a state of incapacity removing secretions or obstruction from airway to maintain airway patency (Perry & Potter, 2014).

Increased airway clearance is one of the effective ways which can be done in patients with pulmonary tuberculosis due to the secretion extremely lot can be clog the airway in many tuberculosis patients and disrupt effective gas exchange. Increase fluid intake provides systemic hydration and serves as an effective expectorant. Pulmonary tuberculosis patients also explained about the best



position you can do to facilitate drainage. Humidifier or a facial mask with high humidity can help in diluting the secretion (Smeltzer & Bare, 2013).

Breath relaxation technique deep and effective cough this is breathing slowly and using the diaphragm, Thus allowing the abdomen to be lifted slowly and fully inflate the chest. Deep breathing and coughing relaxation techniques This effectively serves to achieve ventilation more controlled and efficient as well as for reduce the work of breathing. Increase maximal alveolar inflation, increasing muscle relaxation and breathing relaxation techniques deep and effective cough this works as increase the mobilization of secretions thus sputum is easily removed from the airways (Sasono, 2013)

Effect of The Deep Breath and effective cough techniques against Airway Clearance in Patients with Pulmonary Tuberculosis. Based on the results that the average effect of deep breathing and effective coughing techniques against airway clearance in patients with pulmonary tuberculosis, before do the technique of deep breathing and effective cough is 5.00 with a standard deviation of 0.000. Meanwhile, after a deep breath and coughing techniques obtained average influence of deep breath and effective coughing techniques against airway clearance in patients with pulmonary tuberculosis was 0.83 with a standard deviation of 1.329. Value p Value = 0.001 ($\alpha < 0.05$). So we can conclude that there is influence of the deep breath and effective coughing techniques against airway clearance in patients with pulmonary tuberculosis.

According to research conducted by , stated that the influence of deep breath and effective coughing techniques in patients with pulmonary tuberculosis. More frequent implementation of the technique of deep breath and effective cough is performed; it will be increasingly positive effect on the patient's airway clearance. Techniques of breath and cough effectively is performed because of ineffectiveness airway clearance are a condition where an individual experiencing a real or potential threat to the respiratory status (Carpenico, 2009).

Exercise effective cough serves to remove secretions. Exercise effective cough is very beneficial for tuberculosis patients with impaired airway to remove mucus or secretions in the airway. Coughing exercises that can be done is to sit down with a little bow. Ask the patient inhale deeply and hold and contract your abdominal muscles. Blow breath stronger and coughing. Usually it has to done 2 to 4 times before meals and at bedtime or break night (Perry & Potter, 2014).

CONCLUSION

Pulmonary tuberculosis patients have an unclean airway before being given deep breathing and effective coughing techniques. and after performing effective deep breathing and coughing techniques, it was found that the patient's airway clearance was effective so that it could be concluded that there was a significant effect between effective deep breathing and coughing techniques on airway clearance in pulmonary tuberculosis patients

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