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Deep breathing exercise model on events hospital acquired pneumonia in non hemoragic stroke patients

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ABSTRACT

Background

Stroke occurs that causes a buildup of mucus immobilization and limited lung expansion due to pulmonary pressure when the patient is lying. Therapeutic therapy that can be given to non-hemorrhagic stroke patients namely deep breathing exercise model.

Method

The type of research used is Research and Development (R&D) and the model test uses True Experimental with a pretest-posttest control group design. This study compiled two groups, namely the intervention group and the control. Technique Probability sampling with method stratified random sampling is used to get 34 respondents divided into 2 groups.

Results

The results test Mann Witney show values p value 0,008 which indicates that there is a significant difference between the intervention group and control.

Conclusion

The results of the study after intervention were a decrease in the incidence of Hospital Acquired Pneumonia (HAP) in patients who received Deep Breathing Exercise, so that the intervention was effectively implemented for patients to prevent the incidence of Hospital Acquired Pneumonia (HAP), especially non-hemorrhagic stroke patients.

Keywords: *Deep Breathing Exercise, Hospital Acquired Pneumonia, Non Hemorrhagic Stroke.*

INTRODUCTION

Indonesia is currently facing an epidemiological transition in the world of health, the current problem of infectious diseases has not been resolved optimally while the problem of non-communicable diseases continues to increase. According to the Global Report on Non Communicable Disease (2017) states that the incidence of non-communicable diseases (PTM) causes death by 70% of total deaths from disease. [1] Non-communicable diseases that increase the incidence of morbidity and mortality consist of strokes occupying the first position, then second

place coronary heart disease and diabetes millitus with complications in the third position. [1]

Stroke is one of the causes of death and paralysis. According to the National Stroke Association year (2016) that stroke is a major cause of permanent paralysis in adults. In patients who survive long-term strokes 15% need institutionalized care, 30% depend on their daily activities and 60% experience a reduction in out-of-home socialization. Stroke is a neurological deficit that occurs suddenly for more than 24 hours and is caused bydisease cerebrovascular.

The prevalence of stroke patients based on data from the American Heart Association (AHA) 2018 each year about 795,000 people stroke, 610,000 of them were the first attack and 185,000 people repeated attacks and in 2015 there were 18.8% of deaths from strokes. [3] While the prevalence of stroke patients in Indonesia is based on a diagnosis of health workers of 7 per mile and symptom based ones of 12.1 per mile. [2] The prevalence 2018 of stroke based on doctor's diagnosis in Indonesia is 10.9 per mile. [4] Stroke occurs a lot at the age of 65 years but the last few years of stroke also occur at the age of 15 years. The incidence of stroke at the age of 15 years in Central Java based on the diagnosis of health personnel in 2013 was 7.7%. [2] Stroke incidence increases in Central Java at the age of 15 in 2018 based on a doctor's diagnosis of ±11 percent. [4] Based on medical record data at Bagas Waras Hospital, Klaten, stroke events in the last 3 months of stroke with 59 hemorrhagic people andpatients non-hemorrhagic stroke 153.

Stroke is a disruption of nerve function caused by a disruption ofcerebral blood flow non-traumatic which is often characterized by paralysis of the limbs, facial paralysis, pelo talk, impaired vision and even a decrease in consciousness. Stroke patients need to be hospitalized and intensive observation needs to be done. According to the American Heart Association thetreatment of ischemic stroke patients is minimally admitted to the hospital for 4 days, but if it is with long-term care because of the complication of an average hospitalization of at least 25 days. [5] In Indonesia based on journals the average hospitalization for ischemic stroke patients is ± 7 days and hemorrhagic stroke for ±11 days. [6] Based on the National Health Insurance (JKN) on average for ischemic stroke patients a minimum of 5 days and a minimum hemorrhagic stroke of 7 days. The duration of hospitalization for stroke patients and immobilization conditions causes risk of decubitus and causes a decrease in lung expansion due to excessive pressure on the lung surface resulting in Hospital Acquired Pneumonia (HAP).

Hospital Acquired Pneumonia (HAP) is a lung infection obtained at the hospital after the patient has been treated for 48 hours. HAP increases high mortality rates. Pneumonia affects the recovery of neurological function. [7] HAP incidence in some hospitals reaches 1.6% or 3.63 per 1000 patients / day. [8] HAP accounts for nearly 25% of infections that occur in the ICU, the incidence of HAP increases by 6-fold to 20-fold in patients using mechanical ventilation, but the incidence of HAP hospitalized reaches 2.8-6.1 cases per 1000 patients. HAP that occurs in hospitalizations increases mortality and morbidity as well as long hospitalization days at the hospital. [9] The incidence of pneumonia in Bagas waras Hospital Klaten in the last 3 months 225 people including HAP.

Hospital Acquired Pneumonia is caused by prolonged hospital care, ventilator use and resources in the hospital. Based on clinical practice guidelines by the Society of America and the American Society for the treatment of HAP can be given by giving antibiotics that are in accordance with the results of sputum culture, clinical signs and CPIS assessment. Giving antibiotics is recommended not given more than 7 days. [10] Based on several studies and HAP prevention bundle therapeutic interventions that can be done in preventing HAP are hand hygiene, oral care, head of bed elevation, close suctioning and range of motion (ROM). [11]

Marilyn Schallom's 2015 study of "Head-of-bed elevation and early out-of-date gastric reflux, aspiration and pressure ulcers" stated that there was a decrease in the results of pepsin positive tracheal secretion for pneumonia with an average value before intervention 69.4 and after intervention 62.5. [12] 2017 Hui-Jie research on "the effect of closed suctionreleased into the environmentreduction" stated that there was a decrease in colony formatting units on examination of 100 cm culture with an average value before intervention 15.7 and after intervention 3.1. [13] Niken Setyaningrum's research in 2017 on "Level 1 progressive efficiency on improvement of pulmonary oxygen ventilation function in non-hemorrhagic stroke patient"

intervention in this study consisted of bundles of HAP and ROM, this study stated that there was an improvement in pulmonary ventilation function with an average value before intervention 220 and after intervention 263.65. [14]

Interventions that have been carried out at Bagas Waras Hospital to prevent HAP from happening with head up and ROM positions, even thoughhave been done head up position and ROM but there are still incidents of Hospital Acquired Pneumonia. In addition to head up position and ROM to reduce HAP can also use deep breathing exercise.

Based on this background it is necessary to do research on "deep breathing exercise on changes in the incidence of hospital acquired pneumonia inpatients non-hemorrhagic stroke"

METHODS

This type of research is Research and Development (R&D) and model testing using True Experimental with a pretest-posttest control group design. The researchers compiled two groups, namely the intervention group and control. The incidence assessment Hospital Acquired Pneumonia respondent's (HAP) used the Score Java HAP Sheet instrument which was carried out 4 days before treatment and after treatment. If the total score is 0-1 in the low category, 2-3 in the middle category, 4-5 in the high category.

The population in this study were patients non-hemorrhagic stroke who were hospitalized after 24 hours of care at Bagas Waras General Hospital, Klaten. Determination of the minimum number of samples using a technique sampling probability with the method stratified random sampling and based on inclusion and exclusion criteria as many as 34 respondents were divided into 2 groups with 17 respondents in the intervention group and 17 respondents in the control group.

In this study researchers conducted data collection by observing, identifying, interviewing and filling out the questionnaire. The collected data was analyzed through the IBM SPSS version 24.0, and continued with a different test, namely the non-parametric test (Wilcoxon Test and Mann Withney). The processed data is used as the basis for discussing problem statements, which are then presented in table form so conclusions can be drawn.

RESULTS

Information collection

The results of information collection revealed that patients non-hemorrhagic stroke needed an intervention model to prevent the incidence of hospital acquired pneumonia which could be accompanied by families both at the hospital and at home. So the researchers made amodel deep breathing exercise in the form of a procedure that is simple and can be understood and carried out by the family.

Product Design /Model

Research makes Deep Breathing Exercise Model. This model is an intervention learning given to nurses and families to prevent the occurrence of hospital acquired pneumonia. Deep breathing exercise models can be done in the hospital and at home after the patient is allowed to go home. The implementation of deep breathing exercise model needs to be accompanied by a nurse or family.

Expert Validity Test

Table 1 Statistical Test Validity Expert

Validation *			
	N	**f (%)**	**ρ value**
Relevant	6	100	
Irrelevant	0	0	0.000

* Intraclass correlation coefficient

Table 1 The results of expert validity indicate that the value ρ value = 0.000, which means deep breathing exercise model relevant as an effort to prevent the incidence of hospital acquired pneumonia inpatients hemorrhagic stroke.

Product Testing

Table 2 Frequency distribution of the intervention group and control group based on demographic characteristics (n = 34)

	Group				Total	Levene's test
	Intervention		Control			
	F	%	F	%	N	P
Age						1.000
Middle age (45-60)	8	47.1	8	47.1	16	
Elderly (> 60)	9	52.9	9	52.9	18	

Table 2 shows that the frequency and percentage of respondent characteristics based on the highest age at the age of the elderly (> 60) with a total of 18 respondents consisting of the intervention group 9 respondents (52.9%) and the control group 9 (52.9%), while middle age (45-60) 16 respondents consisting of intervention groups 8 respondents (47.1%) and control group 8 (47.1%). Based on the results of the homogeneity test with the Levene's test the value of ρ> 0.05 means that the respondent's data is homogeneous.

Table 3 The results of the analysis of effectiveness deep breathing exercise on the incidence of Hospital Acquired Pneumonia (HAP) (n=34)

Variables	Group			
	Intervention		Control	
	Mean Rank	P	Mean Rank	P
HAP	0.00	1.000	2.50	0.014

*Wilcoxon Statistical Test

From the table above, shows the results of effectiveness test deep breathing exercise on HAP events pre post in the intervention and control groups, the results were stated to be different if the value of ρ <0.05. Based on the results of the test Wilcoxon above the ρ value in the intervention group of 1.000 which means there is no significant difference in theHAP incidence pre post in the intervention group, while in the control group ρ 0.014 which means there is a significant difference in the incidence of HAP between pre post intervention.

Table 4 The results of the analysis of differences in deep breathing exercise on HAP events (n=34)

Variable	Group		
	Intervention	Control	P
	Mean rank	Mean rank	
HAP	14.50	20.50	0.008

* Mann WitneyStatistical Test

Table above, shows the results of test mann whitney differences in HAP incidence after deep breathing exercise in the intervention and control groups with a value of ρ = 0.008. The results are said to be significantly different if the value of ρ <0.05. Based on these data, there are differences in the incidence of HAP in the intervention and control groups.

DISCUSSION

Expert validity Deep Breathing Exercise Model

The results of expert validity indicate that the value of ρ value is 0.000, which means deep breathing exercise the relevantmodel is an intervention model forpatients non-hemorrhagic stroke. The process of expert validity is important in developing products / models to produce

products / models that are useful in improving the quality of education.

Deep breathing exercise is a simple and easily understood action by the family. This intervention can help families at home in an effort to avoid pneumonia.

Deep breathing exercise can cause relaxation so that it decreases vascular volume from blood vessels and can maintain hemodiamik to remain stable. Deep breathing exercise can be used as a therapy for pulmonary muscles in stroke patients who experience immobilization so as to prevent the occurrence of pneumonia.[15]

Based on this, the deep breathing exercise model can be used as an intervention to prevent changes in the incidence of HAP that can be done by nurses at the hospital or family at home.

Effectiveness Deep breathing exercise against the incidence of hospital acquired pneumonia

This study showed a significant value ρ value of the pre post intervention group 1.000 for theHAP event pre post deep brething exercise , this means that there is no significant difference in the HAP event pre post deep breathing exercise or no HAP in the intervention group. This is because deep breathing exercise can train the respiratory muscles and stimulate cough reflexes that can prevent complications in the form of atelectasis and pneumonia.

This study is in line with Nidhi's research which states that deep breathing exercise can improve pulmonary function so that it can reduce pulmonary complications such as atelectasis and pneumonia.[16] This study was supported by Rondhianto's research which states that after breathing exercises can reduce the colonization of Staphylococcus aureus causing pneumonia. [17]

Immobilisation conditions cause the collection of secretions on the airway and lungs which can lead to bacterial colonization and close a small portion of the road which can result in inadequate ventilation and respiratory disorders resulting in hypoventilation, hypercapnea, and hypoxemia. Deep breathing exercise can help open this closed airway and result in relaxation in the patient. [17]

Deep breathing exercise is a breathing exercise that can increase lung volume and expedite the airway and expel secretions that accumulate in the respiratory tract which can lead to pneumonia. Based on this, deep breathing exercise can reduce the incidence of HAP because deep breathing exercise exercises increase pulmonary ventilation and facilitate secretion expenditure which is buried in the airway due to immobilization.

The difference after doing deep breathing exercise on the incidence of hospital acquired pneumonia in non-hemorrhagic stroke patients

This study shows a significant value of HAP events with a value of ρ value 0.008 which means there are significant differences between the control and intervention groups. This is because in the intervention group carried out deep breathing exercise experienced improvements in respiratory muscle function and stimulated cough reflexes to prevent pneumonia.

This research is in line with this research supported by the research of Seher Unver which states that patients who engage in deep breathing exercise have better respiratory function than those who do not because deep breathing exercises can improve alveolar ventilation function which can prevent pulmonary complications such as pneumonia. [18]

Immobilisation conditions cause the collection of secretions on the airway and lungs which can lead to bacterial colonization and close a small portion of the road which can result in inadequate ventilation and respiratory disorders resulting in hypoventilation, hypercapnea, and hypoxemia.

Deep breathing exercise increases alveolar pressure in each lung lobe so that it can increase airflow during expiration. Increased air flow during expiration will activate the cilia in the mucosa of the airway so that it can evaluate secretions out of the airway. This action is one way to increase lung oxygenation. [15]

Based on this description, deep breathing exercise can help improve pulmonary ventilation, stimulate secretion expenditure so that it can be used as an effort to prevent the incidence of hospital acquired pneumonia inpatients non-hemorrhagic stroke.

CONCLUSION

Based on the results of the study concluded that deep breathing exercise is effective against the prevention of the incidence of hospital acquired pneumonia inpatients non-hemorrhagic stroke as evidenced by:

1. Deep breathing exercise Effectivemodel decreases the incidence of HAP after 4 days of deep breathing exercise in the intervention group (ρ = 1.000)
2. There was a significant difference between the control and intervention groups after aconducted deep breathing exercise model wason the incidence of HAP (ρ = 0.008), and there was no significant difference in respiration rate (ρ = 0.082) and SpO2 (ρ = 1.000) .

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