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THE EFFECT RANGE OF MOTION EXERCISE COMBINATIONS PLUS HEAD UP 300 POSITION ON IMPROVEMENT OXYGEN SATURATION OF STROKE PATIENTS

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Abstract

Stroke is defined as a collection of neurological symptoms, caused by impaired acute brain function both in the focal and global, due to decreased or loss of blood flow in the brain parenchyma caused by obstruction or rupture of blood vessels that inhibit blood vessel circulation so that there is an imbalance of oxygen in the brain. The purpose of this research is to know the influence of the action of range of motion combination and head up 30^0 toward the oxygen saturation of stroke sufferers. The research design is one group pre-post test design. Research samples as much as 25 people. Sampling techniques used in Proposive Sampling. Analysis using Paired sample T-Test with $\alpha \leq 0.05$. The results showed that the average oxygen saturation before the intervention was 91.96, and the average oxygen saturation after the intervention was 92.91. Analysis results indicate the average difference in oxygen saturation after intervention. Range of motion and head up 30^0 position can increase oxygen saturation in stroke patients. It is recommended to use a combination of range of motion exercises plus a head up position of 300 to increase the oxygen saturation of stroke patients.

Key Words: *Range of motion, exercise, oxygen, saturation, stroke*

INTRODUCTION

Non-communicable diseases are the main cause of death in the world, which is responsible for 68% of the 56 million deaths that occur, one of the non-communicable diseases that is a very serious health problem today, one of which is stroke. Stroke is one of the non-communicable diseases which is still an important health problem. It is estimated that 17.7 million people died from stroke, or 31% of all deaths were represented by stroke (WHO, 2015).

Data in the world, 15 million people suffer a stroke every year, a third die and the rest are permanently disabled, more than 795,000 people in America suffer from a stroke and nearly 130,000 Americans die each year (National Center for Chronic Disease Prevention and Health Promotion, 2015). Regionally, the Southeast Asia region is the largest contributor to stroke

patients with a total of 5,101,370 people with a mortality rate of 1,399,737 patients and 3,701,721 patients with disabilities. Indonesia occupies the first position in Southeast Asia with a total of 2,973,932 people with a death rate of 1,737,048 sufferers and a disability rate of 1,236,884 sufferers. The second position is occupied by Vietnam with a total of 700,532 people with a death rate of 58,308 patients and a disability rate of 642,224 (WHO, 2016).

The results of Riskesdas (2018) the prevalence of stroke patients in Indonesia has increased from 7% to 10.9%. The highest cases occurred in the province of East Kalimantan with a prevalence of 14.7 per mil and the lowest in Papua with a prevalence of 4.1 per mil. Meanwhile, Bengkulu is ranked 22nd with a prevalence of 8.0 per mil (15,997 people). The highest stroke cases were those aged 75 years and over (43.1%) and more men (7.1%) than women (6.8%) (Depkes, 2013). In Indonesia, ischemic stroke is the most common type, which is 52.9%, followed by intracerebral hemorrhage (38.5%), embolism (7.2%) and barachnoid hemorrhage (1.4%) (Dinata et al, 2013

The results of the initial survey conducted by the researchers at the Stroke Unit of RSUD dr. M. Yunus Bengkulu, there were 117 hemorrhagic stroke patients in 2016 and 290 non-hemorrhagic stroke patients, 270 non-hemorrhagic strokes in 2017 and 153 hemorrhagic strokes, and in 2018 the 324 non-hemorrhagic stroke patients and 115 hemorrhagic stroke patients . While the data obtained in 2019 from January to August 2019 hemorrhagic stroke patients were 96 people and non-hemorrhagic stroke 198 patients with an average of 26 patients every month (Medical Record of the Stroke Unit of RSUD dr. M. Yunus Bengkulu City).

The American Heart Association /American Stroke Association defines stroke as a collection of symptoms of neurological deficits, due to sudden acute focal or global disturbances in brain function, caused by reduced or loss of blood flow to the brain parenchyma caused by blockage or rupture of blood vessels. Copulan et al, 2017). The inability of brain perfusion to supply sufficient oxygen and nutrients needed for the maintenance of metabolic integrity and neuronal function is brain ischemia. As a result of the cessation of blood and oxygen supply to the brain, it causes a decrease in consciousness, nervous system disorders, headaches, loss of balance and others (Sylvia, 2012).

Actions that can be taken to improve blood circulation so as to increase peripheral tissue perfusion are by adjusting the head up position of 300 and range of motion exercises. The results of this research, Eka *et al.* (2017) conducted another study which stated that oxygen saturation can also be increased by adjusting the head-up position of 300. The results show that the p value = 0.009 < 0.05, meaning that there is an effect that shows that there is an increase in oxygen saturation in stroke patients.

The head up position of 300 shows that the flow behind the blood from the inferior to the right atrium is quite good because the resistance of the blood vessels and the right atrial pressure are not too high, so that the venous return to the right atrium is quite good and the right ventricular filling pressure (preload) is quite good increases, which can lead to increased stroke volume and cardiac output. The patient is positioned head up 300 will increase blood flow in the brain and maximize cerebral tissue oxygenation (Oktavianus & Patricia *et al*, 2014)

Passive range of motion given to the patient can show a good hemodynamic response, so that it can affect the process of blood circulation. The side effect of the absence of mobilization of limb movements can cause changes in oxygen saturation of less than 90%. The results of Sulistyowati's research (2015) showed that those given range of motion showed an increase in oxygen saturation in craniotomy patients (Zakiyyah, 2014).

Regular body movements are very important to reduce peripheral vascular resistance by dilating peripheral blood vessels thereby increasing blood circulation. Smooth blood circulation will launch tissue oxygen transportation so that oxygen needs will be met adequately. Adequate physical exercise will increase cardiac output. Increased cardiac output will increase blood volume and hemoglobin thereby improving oxygen delivery in the body. Nirmalasari (2017) conducted a study on the effect of active range of motion on decreasing dyspnea levels in congestive heart failure patients. The results showed that active range of motion was effective in reducing dyspnea in CHF patients (Arthur, 2016).

METHOD

Research Design and Subject

This study used a pre-experimental method with a one group pretest-posttest design. The research sample was taken using the proportional sampling method with a research sample of 25 people. The population in this study were stroke patients who received care and treatment at RSUD Dr. M. Yunus Bengkulu. Samples were taken using a proposive sampling technique with inclusion criteria: Respondents were all stroke patients (Hemorergic and Non-Hemorrhagic Stroke), with stable hemodynamics, Respondents aged 30-68 years. Exclusion Criteria: Stroke patients who experience respiratory failure, stroke patients who are at risk of cervical fracture/trauma, and restless stroke patients.

Instruments and Data Analysis Techniques

This research was conducted on March 18, 2020 to April 06, 2020, respondents will be given Head Up 300 and ROM exercises for 15 minutes 2 times /day for 2 consecutive days.

RESULTS

a. Analisis *Univariat*

The results of the characteristics of respondents in this study were seen from age, gender, type of stroke. The results of the analysis showed that the average age of the respondents was 54.96 years with SD 9,923, the gender of the respondents was mostly male (52%), the type of stroke of the respondents was mostly hemorrhagic stroke (52%).

b. Analysis Bivariat

Bivariate analysis was conducted to determine the difference in the average oxygen saturation before and after in the same group, namely the paired sample t-test with 5%.

Table 1. Differences in Pre-Post Oxygen Saturation Exercise Range of Motion and Head Up Position 300⁰

Group (n=25)	The Diferent Oxygen Pre and Post Saturation				
	Mean	SD	Std. Eror Mean	CI 95%	P value
	-0,95	0,794	0,159	-1,278 - -0,622	0,000

Table 1 showed saturation values before and after the range of motion exercise and the Head Up position are 300 with the mean-0.95, SD 0.794, SE 0.195 CI 95% -1,278-0.622 with p value 0.000 <0 0.05, then Ha is accepted so that it can be concluded that there is an effect of a combination of range of motion exercise and head up position 300 on increasing oxygen saturation in stroke patients in the Stroke Hospital Room of M. Yunus Bengkulu in 2020.

DISCUSSION

A. Respondent Characteristics

The results of the frequency distribution of respondents based on the age of stroke patients in the stroke room of Dr.M.Yunus Hospital, Bengkulu City, it was found that the average age of the respondents was 54.96 with the oldest age being 67 years. The results of the study are supported by research by Cintya et al (2012) regarding the description of risk factors and types of stroke where the highest incidence of stroke occurs at the age of 50 years (81.25%)

with a peak at age 65 years. Age is one of the risk factors that cannot be changed. The incidence of stroke increases with age. However, now there is a tendency also suffered by the younger age group (<44 years). This is due to lifestyle changes such as consuming fast food that contains high fat, low fiber, smoking habits, drinking alcoholic beverages, overwork, lack of exercise and stress (Junaidi, 2016).

The increase in the incidence of stroke along with increasing age is related to the aging process which is caused because all organs of the body experience a decline in function, including blood vessels in the brain. Changes in the structure of blood vessels to become inelastic, especially the endothelium which has thickened the intima, so that it will cause the lumen of the blood vessels to narrow which has an impact on disrupting blood flow to the brain (Kristiyawati *et al*, 2019).

The results of this study which was carried out on 25 respondents found that in general the frequency distribution of respondents was based on the sex of stroke sufferers in the Stroke Room of RSUD Dr. M. Yunus, Bengkulu City, it was found that most of the respondents were male, as many as 13 people (52.0%). This is in line with research conducted by Irvani Dewi et al (2019) that men have a higher risk of stroke with a percentage of 66.7%. Research conducted by Nastiti (2012) found that most of the stroke patients were male, from 152 inpatient stroke patients, 102 were male. This is in accordance with research conducted by Zang et al (2011) that gender has an effect on the incidence of stroke with an OR in males of 1.593. Men are more likely to have non-hemorrhagic stroke than women 1.3:1, except in elderly men and women, the incidence is almost the same (Junaidi, 2011).

B. The effect of combination of range of motion (rom) exercise and head up position 300 on increasing oxygen saturation of stroke patients

In this study, it was found that there was an effect of a combination of range of motion exercise and the Head Up 300 position on increasing oxygen saturation of stroke patients with a p value of 0.000 with the conclusion that there was an effect of a combination of range of motion exercise and the Head Up 300 position on increase in oxygen saturation in stroke patients.

The results of this study are in line with research conducted by Eka, et al. (2017) with a total of 30 respondents without a control group. The respondents were all types of stroke, both hemorrhagic and non-hemorrhagic, who were given the Head Up 300 position for 15 minutes. This study obtained the results of the analysis of hemodynamic status on oxygen saturation showing a P value = 0.009 so that there is an effect of Head Up

position on oxygen saturation in hemorrhagic and non-hemorrhagic stroke patients.

Theoretically, the supine position accompanied by a head up of 300 shows that the backflow of blood from the inferior to the right atrium is quite good because the resistance of blood vessels and right atrial pressure is not too high, so that the volume of blood entering (venous return) into the right atrium is quite good and right ventricular filling pressure (preload) increases, which can lead to increased stroke volume and cardiac output. Patients positioned head up 300 will increase blood flow to the brain and maximize cerebral tissue oxygenation (Octavianus 2014, Patricia, et al 2014)

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The results of the research conducted on 25 respondents showed that in general the distribution of the frequency of respondents based on the type of stroke in stroke patients in the Stroke Room of Dr.M.Yunus Hospital, Bengkulu City, it was found that most of the respondents had hemorrhagic stroke as many as 13 people (52.0%). The results of this study are supported by research conducted by Krisnawati and Taruli (2012) with a number of 163 respondents showing that the majority of stroke patients experienced hemorrhagic stroke as many as 148 people (89.6%).

CONCLUSIONS AND SUGGESTIONS

Analysis results indicate the average difference in oxygen saturation after intervention. Range of motion and head up 30^0 position can increase oxygen saturation in stroke patients. It is recommended to use a combination of range of motion exercises plus a head up position of 300 to increase the oxygen saturation of stroke patients.

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