

Application of shaker technique and swallow exercise towards dysphagia in stroke patients

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Abstract

Background: Stroke with dysphagia results from a disruption of the swallowing process that requires several sensory input elements from the peripheral nerves, central nerve coordination and motor responses as well as feedback. Dysphagia experienced by sufferers occurs because of interference with the control of innervation during the process of swallowing. Stroke patients with dysphagia can result in malnutrition, dehydration, airway infections, length of number of days of care and even death. One of the treatments for rehabilitation of patients with dysphagia is swallowing exercises and shakers, where the therapy aims to provide a stimulus or stimulation to the swallowing function receptors in the anterior pharyngeal arch, so that the normal physiology of swallowing will return.

Method: The type of research used is True Experiment with a pre-test post-test control group design. This study compiled three groups, namely the intervention group that was given treatment techniques shaker with swallowing exercises, the control group that was given shaker technique therapy without swallowing exercises and the control group who were given swallowing exercise therapy without shaker techniques. Technique Probability sampling with method simple random sampling is used to get 48 respondents were divided into three groups.

Results: Statistical test results One Way ANOVA shows a p value 0.000 (<0.05) which means that there is an influence of the application of techniques shaker and swallowing exercises to increase the status of swallowing stroke patients with dysphagia.

Conclusion: The results of the study after being given nursing action resulted in an increase in swallowing status in patients who received therapy for the application of techniques shaker and swallowing exercises, so that these complementary therapies were effectively implemented for patients who experienced swallowing disorders especially in stroke patients with dysphagia.

Keywords: shaker technique, swallow exercise, dysphagia, stroke

1. Introduction

Stroke is a clinical syndrome condition characterized by acute loss of brain function and causing disability and death [1]. stroke occurs due to blood vessels that carry blood and oxygen to the brain experiencing blockages or rupture, lack of oxygen supply causes the function of controlling the muscle movement of the entire body controlled by the brain does not function normally [2].

Stroke is the biggest threat of long-term disability and mortality. Every year in the world there are 795,000 patients who experience strokes, both new and recurrent attacks. About 610,000 are new attacks and 185,000 are strokes over and over [3]. 2018 basic health research results prevalence of stroke in Indonesia based on the diagnosis of health workers it increased to 10.9 per 1,000 from 7 per 1,000 in 2013. The number of cases of Stroke in 2013 in Central Java as many as 7.8 per thousand consisted and increased in 2018 to 11.2 per 1,000 [4].

The number of stroke events is caused by several risk factors, factors that cause stroke are distinguished into risk factors that cannot be changed, including age and sex while modifiable risk factors include hypertension, diabetes mellitus and dyslipidemia [5]. stroke has a general impact between limb paralysis, perotorpalpable facedrooping face, impaired vision, impaired sensation, impaired speech communication and impaired swallowing or dysphagia [6].

Stroke patients with dysphagia occur due to disruption of

the swallowing process which requires several sensory input elements from the peripheral nerves, central nervous coordination, and motor responses as well as feedback. Dysphagia experienced by occurs due to interference with the control of innervation in the process of swallowing, especially in cranial nerves V, VII, IX, X, and XII. [7] Found about 28-65% of patients who experience dysphagia after a stroke [8]. Stroke patients with dysphagia can result in malnutrition, dehydration, airway infections, length of number of days of care and even death [9].

Swallowing disorders cause symptoms of discomfort in the esophagus so that they are unable to swallow food and fluids. Other signs and symptoms of dysphagia include drooling, difficulty chewing, food stuck in the mouth, taking a long time to swallow, coughing, choking, hoarseness, and food stuck to the esophagus. Management of stroke patients who experience dysphagia as early as possible to reduce the risk of aspiration as well as proven to improve nutritional status, and optimize the recovery program for stroke patients [10].

The process of swallowing is a neurological work system that is synchronous, sequential, coordinated, symmetrical, semi-automatic, unique and specific for each individual. The process of swallowing requires several elements which include sensory input from the peripheral nerve, central nervous coordination, and motoric response as feedback. The swallowing process consists of 3 (three) phases, namely

the oral phase, pharyngeal phase, and esophageal phase^[11]. Handling rehabilitation of dysphagia sufferers, namely: postural techniques, modification of volume and speed of feeding, diet modification, compensatory swallowing maneuvers, techniques to improve oral sensory awareness, electrical stimulation, exercise therapy, and adjusting equipment used^[9].

The nurse as part of the health team, is responsible for handling it professionally according to the standards set, one of which is to practice swallowing and shakers^[12]. Types of swallowing and exercises shaker recommended for stroke patients who experience dysphagia aims to provide a stimulus or stimulation to the swallowing function receptors in the anterior pharyngeal arch or Fauces Pillar, so that the normal physiology of swallowing is expected to return. Other swallowing training activities aim to strengthen the swallowing muscles, increase joint space and improve coordination in chewing and swallowing, while lip and tongue exercises are useful for increasing the ability to hold food out of the mouth and emptying the mouth^[13].

Based on the results of the study, 18 stroke patients with dysphagia obtained swallowing exercises with the technique mandelshon maneuver. All patients experience an increase in swallowing status after one week of swallowing exercise^[14]. Positive results in other studies with a value of $p < 0.001$ were obtained from a total of 20 respondents who had not been able to swallow normally. There were 14 respondents who had normal swallowing status. Swallowing exercises performed on 27 stroke patients who had dysphagia degree III (esophageal phase) was given electrical stimulation to strengthen the cervical and submandibular muscles, it was found that all patients showed an increase in swallowing capacity of 25 (93%) out of 27 respondents from being unable to swallow to being able to swallow softly without choking.

exercises Shaker are management of dysphagia to train the muscles associated with swallowing located at the front of the neck involving isometric and isokinetic contractions. Previous research has explained that exercises are shaker effective for activating the suprahyoid muscle (digastric muscle, geniohyoid and mylohyoid) located in the front of the neck and increasing the anterior and superior movements of the hyoid bone, and contributing to the opening of the upper esophageal sphincter.¹⁵ The results of the study with the technique Shaker with the number of respondents as many as 32 showed a value of $p < 0.05$ that Shaker training is an effective exercise for recovery of swallowing function in stroke patients who experience dysphagia.

Preliminary studies at Tidar Magelang General Hospital were found to be absent, special and comprehensive treatment of stroke patients with dysphagia. This is supported by the study of dysphagia not done intensively, swallowing exercises have been carried out in a structured manner so that the problems dysphagia has not been resolved properly. Nurses also have not utilized the involvement of patients and families optimally in preparing self-care both at the hospital and after returning home from the hospital. So the goal of early management in stroke

patients who experience dysphagia is to provide adequate nutrition to patients in a safe and efficient way to improve their ability to eat and swallow.

2. Methods

The type of research uses research True Experiment with a pre-test-post test with control group design. The researchers arranged three groups, namely the intervention group given treatment shaker techniques and swallowing exercise, the control group that was given treatment shaker techniques without swallowing exercise and the control group who were given swallow techniques without shaker technique. The technique is shaker given once a day for 7 days and swallowing exercises are given once a day with a duration 10 minutes for 7 days. Swallowing status assessments can be done using the instrument Massey Bedside Swallowing Screen (MBS) used for screening dysphagia and the Royal Adelaide Prognostic Index For Dysphagic Stroke to assess dysphagia status Parramatta Hospital Dysphagia Assessment or RAPIDS. Assessment of the status of swallowing a patient who has dysphagia is carried out before and after the treatment procedure.

The population in this study were stroke patients those who have dysphagia are treated in the unit room stroke of RSUD Magelang City in February - March 2019. Determination of the minimum number of samples using probability sampling techniques with method simple random sampling and based on inclusion and exclusion criteria as many as 48 respondents were divided into three groups with each of the 16 respondents in the intervention group (shaker technique and swallowing exercises), 16 respondents in the control group (shaker techniques without swallowing exercises) and 16 respondents in the control group (swallowing exercises without shaker techniques).

In this study researchers conducted data collection by observing, identifying, interviewing and filling out the questionnaire. The collected data was analyzed through IBM SPSS program version 24.0, and continued with different tests namely parametric tests (Paired t test, Independent t test and One Way ANOVA). The processed data is used as the basis for discussing problem statements, which are then presented in table form so conclusions can be drawn.

3. Results

Above table shows that the average age of the respondents in the intervention group 54.8 and the control group techniques shaker the average age of respondents is 58.31, while in the control group the swallowing exercise average age of respondents 57.38. Gender in the intervention group was as many as 11 people (62.8%) and women as many as 5 people (31.2%), the control group was the technique of shaker respondents who were male as many as 10 people (62.5%) and women as many as 6 people (37.5%), while the exercise control group swallowed 6 male respondents (37.5%) and women as many as 10 people (62.5%). The proportion of respondents' sex age in the intervention and control groups was equivalent or homogeneous with a p value = 0.05.

Table 1: The frequency distribution of respondents by age and sex demographic data

Variable	Respondents Group						P value
	Intervention		Control Ts		Control Lm		
	N	%	N	%	N	%	
Age (mean ± SD)	(54.8±5.737)		(58.31±5.225)		(57.38±5.227)		0.883
Gender							0.298
Male	10	62.5	8	50	11	68.8	
Women	6	37.5	8	40	5	31.2	
Total	16	100	16	100	16	100	

*Test Homogeneous

Table 2: Overview respondents in the intervention group and control group

Variable				P Value
Dysphagia	Group	N	Mean ± SD	
Pre-Test	Intervention	16	56.69±5.186	0.225
	Control Ts	16	55.88±4.530	
	Control Lm	16	54.19±4.370	
Post-Test	Intervention	16	85.00±5.514	
	Control Ts	16	76.50±3.883	
	Control Lm	16	75.75±4.612	

*Homogeneous Test

Based on the table above shows that the mean status of dysphagia pre-test in the intervention group is 56.69±5.186. Status dysphagia in the control group the technique shaker was 55.88 ± 4.530 and in the control group the smallowing exercise was 54.19 ± 4.370. Where as dysphagia Post-Test in the intervention group was 85.00 ± 5.514. Status

dysphagia in the control group the technique shaker was 76.50 ± 3.883 and in the control group the smallowing exercise was 75.75 ± 4.612. Based on the table above there is no significant difference between the intervention group and the control group or homogeneous with p value = 0.225.

Table 3: Mean Differences of Dysphagia Before and After Treatment in Intervention Group and Control Groups

Variables	Group	n	Measurements	Mean ± SD	Mean Dif	P value
Dysphagia	Intervention	16	Pre-test	56.69±5.186	28.31	0.000
		16	Post-test	85.00±5.514		
	Control Ts	16	Pre-test	55.88±4.370	20.62	0.000
		16	Post-test	76.50±3.883		
	Control Lm	16	Pre-test	54.19±4.530	21.31	0.000
		16	Post-test	75.75±4.612		

*Paired T test

Based on the table above, there are significant differences in the three groups. In the intervention group the mean value pre-test was 56.69±5.186 after being treated the mean value post-test was 85.00±5.514. There was a significant difference in mean dysphagia in the intervention group

between before and after the application of techniques shaker and swallowing exercises for 7 days with p value = 0.000. Thus with the two control groups there were significant differences in mean dysphagia with p value = 0.000.

Table 4: Analysis of Differences Mean Dysphagia Between Group Intervention and Control group

Variable			Mean ± SD	Mean Dif	P Value
Dysphagia	Group	n			
Pre-Test	Intervention	16	56.69±5.186	0.75	0.640
	Control Ts	16	55.88±4.530		
Pre-Test	Intervention	16	56.69±5.186	2.50	0151
	Control Lm	16	54.19±4.370		
Post-Test	Intervention	16	85.00±5.514	8.50	0.000
	Control Ts	16	76.50±3.882		
Post-Test	Intervention	16	85.00±5.514	9.25	0.000
	Control Lm	16	75.75±4.612		

*Independent t test

Based on the table above there are no differences significant respondents before treatment in the intervention group and the control group with each p value of 0.640 and 0.151.

Conversely there are significant differences in mean dysphagia after treatment on intervention groups and control groups with each p value of 0.000 and 0.000.

Table 5: Analysis Difference Mean Dysphagia Between Intervention Group and Control group

Variable	Sum of Squares	df	Mean Square	F	P value	
Dysphagia	Between Gruops	591.7	2	295.8	72.4	0.000
	Within Gruops	183.8	45	4.06		
	Total	775.6	47			

*One Way ANOVA

on the table above shows that there is significant difference in the difference between the results of the group with a p value = 0.000.

5. Discussion

The results of this study in the intervention group of techniques shaker plus swallowing exercise the mean pre-test value was 56.69±5.186 after being given treatment the mean value post-test was 85.00 ± 5.514. There was a significant difference in mean dysphagia in the intervention group between before and after treatment for 7 days with p value = 0.000. In the control group shaker the mean value pre-test was 54.19 ± 4.370 after being treated the mean value post-test was 76.50 ± 3.883. There was a significant difference in mean dysphagia in the control group technique shaker between before and after treatment for 7 days with p value = 0,000

In the swallowing exercise control group the mean pre-test value was 55.88 ± 4.530 after being treated the mean value post-test was 75.75±4.612. There was a significant difference in mean dysphagia in the swallowing exercise control group between before and after treatment for 7 days with p value = 0,000. Comparison of dysphagia pre-test between the intervention and control groups, conducted paired sample t test (T paired) using the pre-test value for each the intervention group and technique control group shaker showed insignificant results with a P value of 0.640. While the paired sample t test (T paired) uses the test pre-test value for each the intervention group and the control group exercises showed no significant with a p value 0151

Test of independent t test (T unpaired) was then performed between each value of the post-test were the first between the intervention and control group techniques shaker obtained results significantly the value P value = 0,000 and between each of the first scores post-test between the intervention group and the swallowing exercise control group obtained significant results with a value of p value = 0.000.

Looking at the comparison of mean dysphagia in the three groups using the one way ANOVA test, based on the mean difference value between the intervention group and the technique control group shaker was 8,603, the mean difference between the intervention group and exercise control group swallowed 6,625 while the difference between the shaker and exercise control groups was different. swallowing is 1,438. Based on output multiple comparisons shows there are differences in the mean between the intervention groups and the two control groups with a value of P value = 0.000. Conversely there was no difference in the mean between the two control groups shaker and swallowing exercises with a P value of 0.151.

It can be concluded that the mean value of the intervention group is different or significant, while the mean value in the two control groups is the same or there is no significant difference between the two control groups. Variabel which has the most significant influence on differences in mean dysphagia is a group intervention or application of

techniques shaker plus swallowing exercises.

The results of this study are supported by Warlow's statement, that most stroke patients who experience dysphagia will recover their swallowing function within 1-2 weeks after stroke, so it is very rare for those who experience permanent dysphagia [16]. This study relates to the research conducted by Lang more S about Efficacy of exercises to rehabilitate dysphagia: A critique of the literature that to restore swallowing disorders in stroke patients needs to be rehabilitated by swallowing exercises and non swallowing exercises to optimize nutrition and improve eating ability and drink [17]. Management of dysphagia is reducing pneumonia aspiration, Cohen states that the main goal of dysphagia management is to reduce aspiration and regulate difficulty in swallowing rather than rehabilitating [18].

This is in accordance with the theory which says that swallowing or swallowing therapy is a nursing intervention that includes direct and indirect methods. The indirect method or menu compensation aims to increase the power of swallowing muscles without directly changing the physiology of swallowing. As for swallowing exercises using a direct method is designed to change the physiology of swallowing and requires direct participation from the patient [19].

Dysphagia is very common and is most common in patients with stroke. This study concluded that exercise exercises dysphagia was an effective method for increasing the ability to swallow patients suffering from difficulty swallowing [20]. Swallowing exercises provide a stimulus or stimulation to the swallowing function receptors in the anterior pharyngeal arch by regulating the position of the head and body position during feeding, and maintaining oral hygiene or oral hygiene thereby reducing the risk of aspiration, increasing the ability to eat and swallow, and optimize status nutrition.

The results of this study are also in accordance with Logamann's research on exercises shaker coupled with traditional therapy in stroke patients with dysphagia problems and prolonged aspirations with a sample of 19 respondents showing significant results. The results of other studies about the Role of Exercise Programs for Dysphagia Patients can improve the normal functioning of the upper esophageal sphincter by increasing hyolaryngeal removal so that the opening of the upper esophageal sphincter increases [21].

The same result about shaker exercise Augmentation of deglutitive thyrohyoid muscle shortening, video fluoroscopy is used to measure thyrohyoid shortening with the result of increasing shortening of the thyrohyoid muscle and strengthening the suprahyoid muscle. The combination of an increase in thyrohyoid shortening and suprahyoid strengthening contributes to the three phases of swallowing or deglutition of the act of swallowing, where food boluses or fluids flow from the mouth to the pharynx and esophagus into the stomach [22].

6. Conclusion

Based on the results of research on the application of shaker techniques and swallowing exercises to increase muscle swallowing power in stroke patients with dysphagia, the following conclusions can be drawn:

- 6.1 There is a significant difference in swallowing muscle strength before and after the technique shaker plus swallowing exercise with a p value = 0.000
- 6.2 There is a significant difference in muscle swallowing power before and after being given a technique shaker with a p value = 0.000
- 6.3 There was a significant difference in swallowing muscle strength before and after being given swallowing exercise with a p value = 0.000
- 6.4 The application of the technique shaker plus exercise swallowed more significantly to the increase in mean dysphagia compared to the two groups that were significant with a p value = 0.000.

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