

Effectiveness of Acupoint Therapy on Swallowing Ability among Patients with Post-Stroke Dysphagia

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ABSTRACT

Background: Stroke is the disease that causes the greatest death and disability every year, and the sequelae of stroke often include swallowing disorders or dysphagia. Conventional interventions remain the primary choice in the rehabilitation process for post-stroke patients. However, incorporating acupoint therapy interventions as an alternative within the nursing context is anticipated to maximize the recovery process of dysphagia patients. **Purpose:** The purpose of this study is to determine the effect of acupoint therapy and modality therapy on the restoration of swallowing ability in post-stroke dysphagia patients. **Methods:** The research design in this study was to use a quasi experiment. Patients were given intervention for two months or eight treatment sessions to measure swallowing ability using the GUSS (Gugging Swallowing Screen). The criteria for respondents in this study are patients with strokes experiencing swallowing disorders. **Results:** After eight sessions of treatment, respondents showed a very significant increase in swallowing ability; the average value before treatment was 4.2 and after treatment in session 8 was 19.07. The results of the influence test give a p -value of <0.001 . Acupoint therapy interventions are effective in improving the swallowing ability of post-stroke dysphagia patients. **Conclusion:** The application of Acupoint Therapy interventions in post-stroke dysphagia patients has significantly improved swallowing ability; we recommend that this intervention be a supporting option in addition to conventional interventions obtained by post-stroke dysphagia patients.

Keywords: Acupoint Therapy; Dysphagia; Stroke

INTRODUCTION

Stroke is a prevalent condition that frequently affects individuals in their middle and later years, imposing a significant burden on both society and families due to its substantial rates of disability and mortality (Zhang *et al.*, 2024). Stroke is a health issue involving disruptions in blood flow to the brain (Cai, Towne, & Bickel, 2019). The incidence of stroke in today's world is increasingly alarming, where stroke is the second leading cause of death and disability worldwide, with more than 13 million new cases every year (Saini, Guada, & Yavagal, 2021). Stroke also caused deaths and disability to double from the 1990s until now, according to the World Stroke Organization (WSO) (Feigin *et al.*, 2022). In addition to causing death, stroke causes a loss of independence and a decrease in quality of life, although treatment for individuals with previous strokes focuses on patients with an acute phase. The results of recent studies even state that there is a significant group

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of people with persistent disabilities for many years post-stroke. The prevalence of stroke as a degenerative disease has reached as many as 104.2 million inhabitants in the world in the last 3 years. In the United States, stroke is the third leading cause of death, with 146,664 deaths, while data in Indonesia shows that stroke is the third leading cause of death, followed by diabetes mellitus and hypertension, with a mortality rate of 138,268 people, or 9.7% of the total deaths (Blackburn *et al.*, 2020; Duloquin *et al.*, 2020; Khariri & Saraswati, 2021). In Jakarta itself, the incidence rate of stroke is 11.4% of the total occurrences in Indonesia. Jakarta houses national referral hospitals for cerebrovascular diseases such as stroke, with a high incidence rate each year (Kemenkes, 2018).

Requires a critical role from nurses in providing holistic and effective care to patients. Through these roles, nurses not only assist in the physical recovery process for post-stroke patients but also play a central role in enhancing the quality of life and supporting patients in facing the challenges resulting from stroke (Meng *et al.*, 2020). Patients with post-stroke often experience a decrease in swallowing ability as a result of stroke attacks that occur in the blood vessels of their brain and have a fairly high incidence rate in adults and the elderly (Arista, Nurachmah, & Herawati, 2020). In addition, post-stroke patients also often experience impaired motor function, namely dysphagia. The effects of post-stroke dysphagia disorders can increase the risk of malnutrition disorders because the patient cannot swallow food properly (Zielińska-Nowak *et al.*, 2021). The high number of problems caused by sensory and motor disorders in stroke patients is in line with the high incidence of the condition in post-stroke patients. The incidence of stroke continues to increase, so modality therapy is needed to recover post-stroke patients and increase the speed of patient rehabilitation. This study suggests that rehabilitation therapy combined with rapid acupuncture therapy has a potential therapeutic effect on the relief of swallowing and motor dysfunction after stroke (Ma *et al.*, 2024). In response to the challenge, significant endeavors are underway to enhance post-stroke self-reliance. Various studies have shown that the integration of early rehabilitative intervention within a comprehensive stroke unit leads to the most substantial decrease in combined mortality and dependency (Ahmad, 2018).

One of the modality therapies that can be done to overcome dysphagia problems in post-stroke patients is Acupoint Therapy, in addition to functioning to restore sensory disorders (Zhao *et al.*, 2019; Liang *et al.*, 2022). Acupoint therapy emerges as a potential solution, with its non-pharmacological nature involving fine needle punctures at meridian points. In addition to restoring sensory functions, Acupoint Therapy facilitates the recovery of motor disorders, including dysphagia (Zhao *et al.*, 2021). Acknowledging the unique expertise of nurses in patient care, this research emphasizes the role of nursing professionals in administering and monitoring the effectiveness of Acupoint Therapy. Preclinical evidence suggests that Acupoint Therapy is related to the potential for DNA (deoxyribonucleic acid) methylation and brain histone modification, as well as the epigenetic mechanisms of neurotrophic factors derived that can generate antidepressant effects. In addition to that, Acupoint Therapy also serves to improve cognitive function and synaptic plasticity (Kotlyar, 2019). However, even though some studies show positive effectiveness, acupuncture therapy as an adjunct treatment for conventional rehabilitation is still not precisely understood regarding its effects on respondents when performed alongside conventional therapy. Meanwhile, in the referral hospital for cerebrovascular diseases in Jakarta, acupoint therapy has not yet been recommended as an intervention by healthcare professionals, including both doctors and nurses. This is due to doubts about the reliability of the research reference sources. To address this gap, clinical trials are imperative to ascertain the therapeutic benefits of acupoint therapy in the context of dysphagia recovery for post-stroke patients. This study seeks to contribute valuable insights to the nursing field by determining the effectiveness of Acupoint Therapy in addressing dysphagia in individuals recovering from post-stroke complications, with a particular emphasis on the role of nurses in implementing and overseeing this therapeutic approach. Thus, the purpose of this study is to determine the effectiveness of Acupoint Therapy in addressing dysphagia in post-stroke dysphagia patients.

METHODOLOGY

Study Design

This is a study with a quasi-experimental design involving 30 respondents, calculated using GPower software. The researcher inputted data into GPower using the following parameters: test family: *t*-test, statistical test: means difference between two dependent means (matched pairs), type of power analysis: a

priori, computing the required sample size given alpha, power, and effect size. The input parameters were set as one-tail, effect size 0.85, alpha error probability 0.05, and power 0.80, resulting in 30 respondents. Furthermore, the possibility of a 20% drop-out was considered (Luykx, 2009). The research was conducted at one of the Acupoint therapy clinics in Jakarta, and the sampling was performed using purposive sampling based on the initial screening of the patient's swallowing ability.

Sample/Participant

This research lasted for 2 months, starting in August 2022 and ending in September 2022. The variables in this study were respondents' characteristic data consisting of age, gender, education, occupation, stroke type, acupoint therapy as independent variables, and swallowing disorders as dependent variables. The population in this study was all post-stroke patients who underwent post-stroke rehabilitation therapy. The sample in this study was post-stroke patients who underwent rehabilitation with acupoint therapy. The sampling technique in this study was purposive sampling, which was adjusted to the inclusion criteria, namely post-stroke patients with dysphagia, willing to be respondents, compositis awareness, and exclusion criteria in this study were patients with acute stroke conditions, stroke patients with comorbidities and aphasia, or stroke patients who could not speak. The number of samples in this study was 30.

Intervention

Based on the research design conducted by the researchers, they divided this study into two stages. The first stage involved dysphagia screening using GUSS (Gugging Swallowing Screen). Following that, the second stage consisted of intervention implementation and data collection, wherein certified therapists conducted the intervention while the researchers observed and recorded the intervention's outcomes based on the established instruments. The intervention was carried out over eight sessions. Two treatment sessions were conducted every week, resulting in a one-month duration for one patient to complete the planned eight sessions. During the acupuncture intervention sessions, the following points were used: Baihui GV 20, Sihengong EX-HN1, Fengchi GB20, Neiguan PC6, Shousanli LI10, Shuigou GC26, and Fengvu Gv16 (Jianyi *et al.*, 2023; Yu, Xing, & Zhang, 2020). The study's execution was completed within two months to fulfill all sessions for each participant.

Instrument

The instrument used in this study was GUSS, with a sensitivity level of 90.9% and a specificity of 69.2% (Park, Kim, & Lee, 2020). The GUSS assessment was conducted by making observations such as alertness, cough, voice changes, and ability to swallow or not. GUSS consists of seven assessments during the observation, including alertness, throat cleanliness/cough, saliva swallowing, swallowing of semi-solid, liquid, and solid food, coughing during swallowing, saliva leakage during swallowing, and voice changes during swallowing. The lowest GUSS score for patients was <10, indicating severe dysphagia; 10–14, indicating moderate dysphagia; and >15, indicating mild dysphagia.

Data Analysis

Data analysis in this study employed univariate, bivariate, and multivariate analyses. The statistical analysis application used in this study was JAMOVI 2.3.18, an open-source application that can be downloaded for free from the official website. Univariate analysis employed descriptive analytics; bivariate analysis used a paired *t*-test after conducting normality tests; and multivariate analysis used a repeated measure ANOVA, a test to observe the distribution of mean values for each treatment session across all sessions.

Ethical Consideration

Ethical clearance for this study was obtained from the Research Ethics Commission of the Cakra Brahmanda Lentera Institute, Indonesia, with reference number 067/028/VII/EC/KEP/LCBL/2022 on 28th July, 2022.

RESULTS

The results of the research conducted are presented in tables and graphs consisting of characteristics of

age, gender, education, work, type of stroke, and swallowing function. Bivariate analysis was used to look at the effect of Acupoint Therapy on swallowing ability, and the ANOVA repeated measure test was used to see improvement in each session.

Table 1: Characteristics of Respondents by Age, Gender, Education, Occupation, Type of Stroke (n=30)

Variable	Category	Mean (SD)/ n (%)
Age, Mean (SD)	Age	55 (9.7)
Swallowing Function, Mean (SD)	Swallowing Function	4.20 (1.35)
Gender, n (%)	Man	26 (86.7)
	Woman	4 (13.3)
Education, n (%)	Elementary School	8 (26.7)
	Junior High School	2 (6.7)
	Senior High School	14 (46.7)
	University/College	6 (20)
Work, n (%)	Not Working	10 (33.3)
	Private Employees	8 (26.7)
	Self-employed	8 (26.7)
	Housewife	4 (13.3)
Types of Strokes, n (%)	Ischemic	20 (66.7)
	Hemorrhagic	10 (33.3)

The results of the study can be seen in Table 1. It showed that the average age value of respondents was 55 years old with a poor swallowing function ability of 4.20. The majority of respondents were male, with a percentage of 86.7%; the respondent's highest education was high school (46.7%); the respondent's most common occupation was no longer working (33.3%); and the respondent's most common type of stroke was ischemic stroke (66.7%).

Table 2: Effect of Acupoint Therapy on Dysphagia Recovery in Post-Stroke Patients

Variable	Measurement	Mean	SD	p-value ¹	p-value ²
Dysphagia	Before	4.20	1.47	0.058	0.001**
	After	19.07	1.98		

*Significant Correlation at <0.051= Normality Test
 **Significant correlation at <0.012= Paired t-test

Based on table 2, bivariate analysis results were obtained using a paired t-test. This test was used because, from the normality test results, normal distributed data with a p-value of 0.058 was obtained. From the results of statistical analysis with a paired t-test, significant results were obtained with a p-value <0.001.

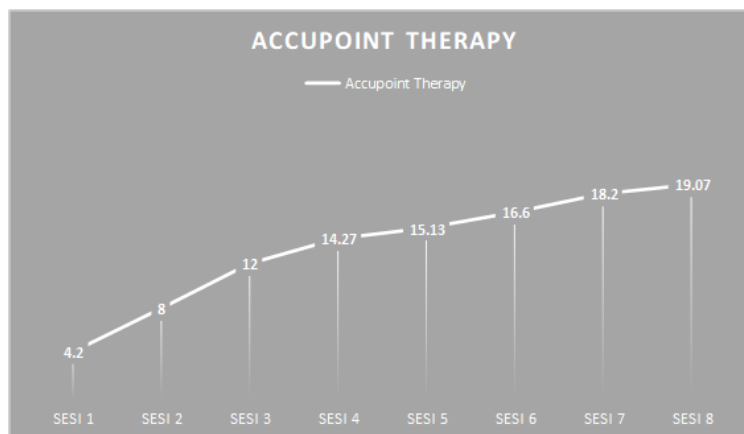


Figure 1: Increased Average Swallowing Ability after Intervention

Based on diagram 1, it was found that there was an increase in the average value of the patient's swallowing ability from the first session, which was 4.2; the highest increase occurred in the last session, which was 19.07. From the diagram, it is known that the increase from session 4 to session 5 is not very significant, from 14.27 to 15.13.

DISCUSSION

Age, Gender, Education, Occupation, Stroke Type

The results of the study obtained by the researchers found that the average age of respondents was 55 years, which was included in the pre-elderly age. The occurrence of stroke at that age occurs because the older a person is, the more risky it will be to develop atherosclerosis blockages around human blood vessels (Fu *et al.*, 2020). If blockages occur in the blood vessels of the brain, there will be ischemic strokes and hemorrhagic strokes (Liu *et al.*, 2023); the majority of the subjects in this study are men compared to women. In theory, women are said to have stronger protection than men. This is because women have a high estrogen hormone, which functions as a protector of atherosclerosis attachment to blood vessels. In addition, previous studies have stated that stroke patients often occur in men rather than women. From these results, it can be concluded that pre-elderly age and male sex are risk factors that allow stroke to occur due to decreased body ability factors that affect the body's protective power against atherosclerosis attachment, which can cause ischemic damage, especially in the blood vessels of the human brain (Liu *et al.*, 2023).

From the results of education and employment, it was found that most of the respondents were educated in secondary education, and most of the respondents were no longer working. In theory, one of the qualities of a person's life is influenced by educational factors, where the higher a person's education, the better the quality of life of post-stroke patients. Likewise with respondents' jobs that are mostly not working where it is possible that respondents have entered retirement, this is reinforced by previous studies where stroke patients are on average in the old age range and are no longer working (Cai, Towne, & Bickel, 2019). In addition, there is a relationship between patients who are no longer working and health problems such as diabetes and hypertension. From these results, it can be assumed that education is an important factor that affects the quality of life of patients who have had a stroke, and most of the respondents are no longer working because of the age of the elderly, where patients have mostly retired from their jobs. (Kariyawasam *et al.*, 2020; Fabunmi, Sanuade, & Adepoju, 2019).

The last demographic characteristic is the type of stroke. The results of the study found that the most common types of strokes in respondents had a history of ischemic stroke. Ischemic stroke is a stroke caused by a blockage that occurs in the blood vessels of the brain that causes ischemia and infarction so that there is a death of brain cells and ultimately results in impaired motor and sensory functions that affect the movement and perception of people affected by stroke (Ghosh *et al.*, 2019). Other studies state that ischemic stroke is a type of stroke that is often encountered in patients with neurovascular obstruction problems (Das *et al.*, 2023; Beheshtian *et al.*, 2020). The determination of the type of stroke before this therapy is important so that the type of therapy given is appropriate and there is a significant increase in recovery. Based on research conducted by Elsner *et al.* (2020), the previously known characteristics of stroke have a fairly good effect on the therapeutic response given. Researchers assume that regardless of the type of stroke and whether it has caused infarction or death in brain cells and tissue, motor and sensory disorders will occur according to the degree of damage to the brain cells, so rehabilitative therapy must be continuously given, especially for the recovery of motor and sensory disorders in post-stroke patients (Elsner *et al.*, 2020).

Effect of Acupoint Therapy on Swallowing Function in Post-Stroke Patients

Based on the results of studies that have been carried out by researchers, it was found that the average value of swallowing ability in post-stroke patients is very low and is at risk for aspiration. After intervention, the patient's swallowing ability is getting better and increases very significantly. In theory, the ability to swallow or dysphagia in post-stroke patients or stroke patients is something that happens frequently (Jones, Colletti, & Ding, 2020). One of the beneficial interventions to improve the recovery of the patient's

swallowing ability is Acupoint Therapy (Zhao *et al.*, 2019). Acupoint therapy has a good effect, especially for stroke patients. The recovery mechanism is carried out by means of improving the circulation of cerebral tissue and increasing the release of acetylcholine and muscarinic receptors of type 3. In addition, the results of a study conducted by Lin *et al.* (2023) stated that acupoint therapy can improve the patient's motor activity by activating the basal area of the ganglia in the hemispheric ipsilateral area (Lin *et al.*, 2023). The session that had quite the highest assessment in some studies was the middle session at each session of the treatment given, as was done by Kim *et al.* (2020), where the condition of the second session was a fairly high session of the increase in the average value of the measured results. According to the results of the study conducted by the researcher after the 4th session, there was no significant increase for the next session, but the increase occurred consistently until the last session. Another indication of improving motor function in post-stroke patients after an intervention is spontaneous brain activity, a state of increased rest in the bilateral basal ganglia and insula (Kim *et al.*, 2020).

In addition to affecting the patient's swallowing function, this therapy serves to increase sensory activity with various conditions that occur after Acupoint Therapy is carried out. One of them is that stroke patients who undergo acupoint therapy will experience an increase in density from dendritic spines in the hippocampus region of the brain (Wang *et al.*, 2020). In addition, acupoint therapy can increase the expression of cell division cycle 42, ras-related C3 botulinum toxin substrate 1, and F-actin proteins in the family of RhoGTPase, which function actively in the formation of cytoskeletons from dendritic synaptics present in brain neurons (Zhang *et al.*, 2023). Therefore, based on assumptions from the results of the study and the concept of theory and the results of previous research, it is concluded that this intervention is very effective in restoring motor function, especially swallowing disorders, in post-stroke patients with dysphagia. This therapy is the recommended therapy to speed up the process of restoring the patient's swallowing ability, especially in post-stroke patients. Furthermore, this study explains that the effects of acupoint therapy can be scientifically proven, and it is evident that acupoint therapy is highly effective, making it a recommended practice by healthcare professionals both in hospitals and within the community.

Implication and Limitations

The findings of this study suggest that patients with post-stroke conditions with dysphagia can be given acupoint therapy to maximize rehabilitation therapy and restore the patient's swallowing ability. The limitation of the research in this study is that researchers do not measure dysphagia levels evenly at the treatment baseline, so it is recommended that subsequent studies homogenize the ability of each patient's dysphagia degree. In addition, the number of respondents can be increased to further increase the level of accuracy of the research conducted. On the other hand, this research can be a reference and can be used by the community to consider acupoint therapy interventions as interventions that are beneficial for the recovery of dysphagia patients.

CONCLUSION

Acupoint therapy is highly significant in improving swallowing ability, especially in post-stroke patients with dysphagia. This study can serve as a specific reference for complementary nursing and as the foundation for evidence-based nursing interventions that can be applied to patients. For future research, it is recommended to use a larger sample size with a research design incorporating a randomization system to minimize potential biases arising from the conducted study.

Conflict of Interest

The author declares that there is no conflict of interest of any kind or with any organization based on the results of this research.

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