Research Article

Intonation Melody Therapy to Improve Language Production in Patients with Non Fluent Aphasia Disorder Post Stroke

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Abstract

Aims: This Evidance Based Nursing Practice (EBNP) is to increase language production in patients with non-fluent aphasia post stroke.

Methods: This EBNP method uses pre and post to see an increase in language production by assessing token test scores. By calculating the number of samples G-Power version 3.1.9.7 as many as 7 respondents. Data processing using Jamovi.

Results: The analysis obtained using the t-test showed that the token test score experienced a significant change before and after the administration of intonation melody therapy (pValue <0.001), while the outcome of an increase in language production showed a significant change after administration of intonation melody therapy (pValue 0.896) with an average mean change mean 11.4 (95% CI: 6.28 -16.6) and moderate effect size (Cohen's d: 0.205).

Conclusion: provision of melodic intonation therapy is proven effective in increasing language production in patients with post stroke non fluent aphasia.

Keywords:
EBNP, Post Stroke Non Fluent Aphasia Disturbance Melodic intonation therapy

INTRODUCTION

Stroke is the second leading cause of death after heart disease and the third leading cause of disability in the world. According to data from the World Stroke Organisation, there are 13.7 new cases of stroke each year and approximately 5.5 million deaths from stroke. The prevalence of stroke shows. About 70% of stroke diseases and 87% of deaths and disabilities due to stroke occur in low- and middle-income countries. An estimated 12.2 million people in the world suffer from stroke each year. Of these, more than 16% of stroke cases affect the population aged 15-49 years and more than 62% are under the age of 70 years. Annually, 47% of strokes occur in men and 53% in women. The global stroke mortality rate per year is reported at 6.5 million people (1).

The prevalence of stroke varies in different parts of the world. Stroke in the United States is approximately 7 million (3.0%), while in China the prevalence of stroke ranges between (1.8%) (rural) and (9.4%) (urban). Worldwide, China has the highest death rate from stroke (19.9% of all deaths in China), along with Africa and North America. In Indonesia itself based on the results of the 2018 Rikesdas Nationally, the prevalence of stroke in Indonesia based on a doctor's diagnosis in the population aged ≥ 15 years is (10.9%) or an estimated 2,120,362 people. Based on age groups, the incidence of stroke occurred more in the

age group 55-64 years (33.3%) and the proportion of stroke patients was the least in the age group 15-24 years. Men and women had almost the same proportion of stroke incidence. Most stroke survivors had primary school education (29.5%). The prevalence of stroke disease living in urban areas is greater at (63.9%) compared to those living in rural areas at (36.1%) (2).

Stroke occurs when brain tissue is disrupted due to reduced blood flow or oxygen to brain cells. Clinical manifestations that appear depend on the area of the brain that is blooded by blood vessels that experience occlusion or rupture, including Anterior circulation disorders (carotid system) caused by disturbances in this circulation system that provide signs and symptoms of cerebral hemispheric dysfunction such as aphasia, apraxia, or agnosia. In addition, hemiparesis, hemisensory disorders, and visual field disorders may also occur. Aphasia is common after stroke, with an estimated frequency of 30 and 34% for the acute and rehabilitation settings, respectively (3). Based on observations during residency on the hospital grounds, the phenoma of stroke patients with various impacts of stroke experienced aphasia disorders, the patient's family said that there was no intervention to overcome the problem of aphasia carried out in post-stroke patients.

The effects of stroke on individuals can result in various physical changes, such as loss of motor function, paralysis on one side of the body, dependence on assistance for walking, reduced tendon reflexes, difficulty swallowing, impaired sensory interpretation, diminished visual function, and alterations in the ability to perform daily activities. Communication challenges, such as speech difficulties, speech abnormalities, and the inability to perform previously acquired activities, are among the social repercussions of social changes in post-stroke patients. Functional consequences in individuals who have experienced a stroke also result in alterations in physical appearance, modifications in societal roles, the process of reintegrating into society, and limitations on engagement in social activities, ultimately leading to a reduction in social interactions (4). Alterations in mental and emotional states Patients may experience psychological consequences and reduced cognitive function, characterized by symptoms such as short attention span, trouble in understanding, forgetfulness, depression, anxiety, and lack of enthusiasm. These symptoms can lead to frustration in the healing treatment process (5).

Language difficulties typically arise from stroke-induced impairment to the dominant hemisphere. This pertains to numerous linguistic impairments that are acquired due to cerebral injury. Aphasia is classified according to its clinical symptoms. Aphasia is categorized into two main types: fluent aphasia, which includes sensory aphasia (also known as Wernicke's aphasia), conduction aphasia, amnesic (or anomic) aphasia, and sensory transcortical aphasia; and non-fluent aphasia. The types of aphasia that are considered fluent include motor aphasia (Broca), global aphasia, and transcortical motor aphasia. Motor aphasia, often known as Broca's aphasia, is the predominant type of aphasia. Aphasia hampers the patient's capacity to comprehend and convey information effectively, affecting both their ability to grasp spoken language and express themselves verbally (6,7).

Accurate statistics on the prevalence of aphasia in Indonesia is currently unavailable. Approximately 20-30 percent of individuals who have had a stroke may get aphasia. By computing the prevalence of stroke in Indonesia, which stands at approximately 10.9 per 1,000 individuals, we may estimate that the occurrence of aphasia resulting from stroke cases amounts to approximately 600,000 to 900,000 individuals. Multiple studies have demonstrated the utilization of music

therapy as a treatment for individuals with non-fluent aphasia, a condition characterized by the loss of speech following a stroke. Studies have indicated that the areas of the brain associated with the right hemisphere show increased activity when singing, as described by Puspitasari (8)

Music therapy that incorporates melodic aspects is regarded as a possible remedy for non-fluent aphasia. This is because singing has the ability to stimulate the patient's right hemisphere, which can compensate for the damage in their left hemisphere (9,10). Another therapeutic approach that can be utilized to address aphasia in individuals is Melodic Intonation Therapy. Intonation Melody Therapy (TMI) is a widely recognized treatment for speech recovery in individuals with non-fluent aphasia. It is believed to enhance the participation of the right hemisphere in language processing. Music-based therapy designed to enhance language abilities by including intonation and rhythm as the primary aspects. This review specifically examines research on the lateralization of language and the reconfiguration of neural pathways using neuroimaging and neurophysiological approaches in individuals with nonfluent aphasia following a stroke. Speech therapy is a type of rehabilitative therapy used to treat aphasia issues. This is crucial because speech and communication play a significant role in social interaction. Impaired communication can result in social withdrawal and emotions of exasperation (11).

METHODS

The implementation of evidence-based nursing practice (EBNP) was conducted at RSPON Prof. Dr.dr. Mahar Mardjono Jakarta on the 7th floor treatment rooms (A and B). The study, titled "Melody Intonation Therapy for Enhancing Language Production in Patients with Post-Stroke Non-Fluent Aphasia," spanned a duration of 4 weeks, from April 10th to May 26th, 2023. A total of 7 post-stroke respondents, who were receiving treatment at RSPON, were included in the study. Prof Dr.dr. Mahar Mardjono engages in a 20-day practice of listening to music and singing songs, focusing on reproducing the melody's intonation. The purpose of this practice is to enhance language creation, with sessions lasting 10-15 minutes and occurring 1-5 times each day over a period of 4 weeks. To conduct an analytical model with the T test. The intonation melody therapy variable is part of the categorical data type and is associated with an increase in language production, which falls under the numerical data type. The statistical analysis utilized is the independent sample T-test, with a resulting ρ-value greater than 0.05.

RESULTS

The univariate analysis in the application of EBNP yields results pertaining to age, gender, history of stroke, duration of treatment, type of music, length of therapy time, token test results, and the application of intonation melody therapy to enhance language production in post-stroke patients with non-fluent aphasia disorders.

Distribution of Respondent Characteristics based on age, gender, history of stroke, days of treatment, music and length of duration of intonation melody therapy to improve language production in patients with post-stroke non-fluent aphasia.

Table 1 Distribution of Respondent Characteristics

Variable	Mean (SD)	N. (%)
Age		
< 60 years	-8.57	3 (42,9)
≥ 60 years		4 (57,1)
Gender		
Man	51.43	5 (71,4)
Woman		2 (28,6)
History of Stroke		
Ischemic Stroke	51.29	4 (57,1)
Hemorrhagic Stroke		3 (42,9)
First day of treatment		
< 3 day	51.31	1 (14,3)
≥ 3 day		6 (85,7)
Type of mucis		
Religious Music	50.71	4 (57,1)
Dangdut music		3(42.9)
Duration		
10 minutes		3 (42,9)
15 minutes	38.36	4 (57,1)

Based on the data, a significant proportion of participants were above the age of 60 (57.1%), and the majority of participants were male (71.4%). 57.1% of the participants encountered an ischemic stroke, which was the most common type of stroke reported. 85.7% of the participants received therapy for more than 3 days, based on the duration of care they received. Most respondents exhibited a predilection for a specific type of music. The music genres in question consist of religious music and dangdut, with the latter representing 42.9% of the overall composition. Approximately 57.1% of participants indicated that they utilized a time period of 15 minutes.

Output	N	Pre Test Mean (SD)	Post Test Mean (SD)	Mean Different (95% CI)	Effect Size	P value
Enhancement Language Production	**7**	6.00	11.4	6.28 -16.6	0,205	0.896

The data analysis revealed that the token test scores of patients with post-stroke non-fluent aphasia disorders at the Jakarta National Brain Center Hospital followed a normal distribution, as determined by the Shapiro-Wilk normality test (p-value < 0.05). Hence, the application of EBNP employs the dependent t-Test for inferential analysis. The t-Test analysis revealed a significant change in the Token Test score before and after the administration of melody intonation therapy ($p < 0.001$). The average change was 11.4 with a 95% confidence interval of 6.28 to 16.6. The p-value was 0.896, indicating significance, and the Cohen's

effect size value was 2.05, indicating a moderate effect.

DISCUSSION

The application of EBNP by resident nurses for intonation melody therapy has shown to improve language production in patients with Post Stroke non-fluent aphasia disorders. The average value before the intervention was 6.00. Following the melodic intonation therapy session, the mean score increased to 11.4. Jeon et al. (12) conducted research that showed language production improvements in six individuals with chronic aphasia following melodic intonation treatment (MIT). These gains were observed on a follow-up assessment conducted 6 months later. A study was conducted on a group of 11 patients with chronic non-fluent aphasia who had difficulty speaking English. The researchers investigated the impact of MIT and found that it led to enhancements in communication skills and the ability to speak fluently. However, it was seen that the benefits of MIT were restricted in cases of chronic non-fluent aphasia. While the effects may be modest and the capacity to generalize to functional language use cannot be proven, it is important not to underestimate the significance of being able to utter a partner's name or request a beverage, as it can greatly enhance one's quality of life. who, prior to attending MIT, was unable to articulate coherent speech.

A highly formal approach to treating aphasia using music is Melodic Intonation Therapy (MIT) (13). Aphasia commonly occurs as a consequence of stroke, with an estimated occurrence rate of 30-34% in acute and rehabilitative settings, respectively. The ability to produce language in these patients is primarily restricted to the expression of only one or two words. Nonfluent aphasic patients, although experiencing significant difficulties in producing words, are able to sing with fluency. This observation has led to the utilization of singing and music in the treatment of aphasia. Functional communication refers to the skill of effectively conveying messages using spoken, written, or non-verbal means, either individually or in combination, during everyday interactions. Speech and language therapists are now collaborating closely with individuals who have aphasia, as well as their family and caregivers, to optimize their ability to communicate effectively (14).

LIMITATIONS

The implementation activities of EBPN at the National Brain Center Hospital are subject to several limitations. Post-stroke individuals with aphasia disorders who were scheduled for control did not attend. As a consequence, it was necessary to once again reach out to the families of patients who fulfilled the specified criteria for inclusion. In addition, it significantly impacted the timeline for doing the research, originally scheduled to be completed in May but delayed until June 2023. As the patient did not come back for follow-up monitoring, the nurse conducted a Home Visit as agreed upon with the respondent. During the implementation process, patient therapy cannot be conducted without any constraints. Therefore, the head of the room determines the therapy utilized by responders based on established management policies.

Implementing Evidence-Based Nursing Practice (EBNP) has several benefits, one of which is its applicability in healthcare services, particularly in nursing care for stroke patients with aphasia disorders. EBNP music therapy involves utilizing music as a means to induce comfort and relaxation in individuals. This approach has been found to effectively alleviate the intensity of stroke patients' symptoms during their prolonged treatment process. Acquiring and utilizing the facilities and infrastructure required for music therapy is readily accessible and straightforward for participants. In order to increase flexibility in scheduling and ensure that music therapy sessions are conducted over a

period of at least four weeks or more than 20 sessions, it is expected that the outcomes will be further optimized.

CONCLUSION

Melody Intonation Therapy (MIT) is a favorable choice for rehabilitating individuals with non-fluent aphasia following a stroke, since numerous studies have demonstrated enhanced language output outcomes in patients. Various neurological factors underlie how melodic intonation therapy facilitates the restoration of language function. The outcomes of using intonation melody treatment align with the objective of employing evidence-based nursing practice (EBNP), specifically that the standardized protocol for utilizing intonation melody therapy can enhance language production in post-stroke patients with non-fluent aphasia disorders. Based on prior research findings, implementing intonation melody therapy for 1-5 daily sessions can substantially enhance language production, with a moderate effect size of 0.205. The application of intonation melody therapy on 7 respondents resulted in an average increase of 11.4 in voice production. The Cohen's effect size value of 0.205 indicates a moderate effect. This therapy was applied for 20 days or more, with 1-5 sessions. This can be achieved by expanding the implementation of intonation melody therapy to include a larger number of participants who are interested in different music genres, based on their personal preferences. It is important to schedule the therapy sessions at a time that does not coincide with the participants' medication intake or visiting hours, in order to maximize the potential for a substantial and meaningful improvement. The aim is to obtain a larger effect size, surpassing the current results.

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