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THE EFFECT OF AIUEO AND BLOWING-PIPE SPEECH THERAPY ON VERBAL COMMUNICATION DISORDERS IN STROKE PATIENTS: CASE REPORT

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ABSTRACT

Introduction: Stroke is an acute clinical event in the form of a focal or global neurological disorder associated with cerebral circulation disorders that lasts more than 24 hours resulting in death without a known cause other than originating from the blood vessels. One therapy that can be given to stroke sufferers who experience speech disorders is speech therapy. **Purpose**: This case study aims to determine the effect of AIUEO speech therapy and blowing pipe therapy on verbal communication disorders in stroke patients. **Methods**: Implementation based on Evidence-based Nursing (EBN) refers to PICO by searching for related articles and journals from 2019-2023 using Google Scholar and it was found that AIUEO speech therapy and blowing-pipe are references that can be used for nursing interventions. AIUEO speech therapy intervention combined with blowing-pipe therapy was carried out one morning and one evening for 5 days. Evaluation of the results of the implementation of the therapy provided using Tikofsky's 50 Word Intelligibility Test instrument which was measured before and after therapy was given for 5 consecutive days. Keywords used: AIUEO speech therapy, blowing-pipe therapy, verbal communication disorders. **Discussion**: The evaluation results showed that there was a decrease in verbal communication disorders as evidenced by an increase in Tikofsky's 50 Word Intelligibility Test score from 48 to 66. This shows that the patient was able to pronounce more words clearly. **Conclusion:** There was a reduction in verbal communication disorders in patients after being given AIUEO speech therapy intervention and blowing pipe therapy.

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INTRODUCTION

According to the World Health Organization (WHO) in 2018, it is one of the main health problems in the world. Stroke is ranked third in causes of death, namely 5.5 million people died in 2013 and this increased to 12% in 2018, namely around 14 million people (WHO, 2018). The prevalence of stroke in Indonesia has increased by 76.5%. Strokes are more common in men (11%) than women (10%). The highest number of stroke sufferers occurs at the age of 75 years and over (50.2%) (Riskesdas, 2018). In 2018, stroke cases in Central Java were recorded 76,604 in community health centers and hospitals, with 16,415 hemorrhagic stroke cases and 58,189 non-hemorrhagic cases (Central Java Provincial Health Office, 2018).

A stroke is an acute clinical event in the form of a focal or global neurological disorder associated with cerebral circulation disorders that lasts more than 24 hours resulting in death without a known cause other than originating from the blood vessels (Fekadu et al., 2019). Stroke is divided into two, namely non-hemorrhagic stroke and hemorrhagic stroke. Non-hemorrhagic stroke occurs because the blood supply to brain tissue is reduced due to total or partial obstruction of the brain's blood vessels. Hemorrhagic stroke occurs due to bleeding caused by the rupture of blood vessels in the brain area and usually occurs when the sufferer is doing activities. Hemorrhagic stroke is further divided into two, namely

intracerebral hemorrhage (ICH) and subarachnoid hemorrhage (SAH) (Tadi & Lui, 2023).

A stroke on the left side of the brain affecting the patient's speech center has a high probability of experiencing speech disorders or aphasia. The left brain functions to analyze, conceptualize, think logically, and understand language. Signs and symptoms of difficulty in speaking verbally, difficulty in controlling coordination, and speech that is often unintelligible are signs of motor aphasia due to damage to the brain layer on the surface of Broca's area (Yulianto et al., 2021). Dysarthria is a motor speech disorder that causes a person to have abnormalities in spoken language as a result of damage to the central or peripheral nervous system resulting in impaired muscle control of the speech mechanism. Speech motor control consists of adjusting speed, range of movement, and temporal coordination of muscle activity across a number of single large muscles that contribute to speech breathing, phonation, and articulation (Hertrich et al., 2021).

Stroke risk factors have two types, namely non-modifiable and modifiable risk factors. Factors that cannot be modified include age, gender, ethnicity, and genetics. Risk factors that can be modified include hypertension, diabetes mellitus, heart disease, inflammation, smoking, hyperlipidemia, alcohol consumption and substance abuse, obesity, and lack of activity (Murphy & Werring, 2020).

One therapy that can be given to stroke sufferers who experience speech disorders is speech therapy. Speech therapy is an action given to individuals who experience communication disorders, speaking disorders, and swallowing disorders. Speech therapy has various types and can be combined, namely AIUEO therapy and blowing pipe. AIUEO therapy is a therapy that uses a method of imitating every movement of the speech organs and sounds produced by the nurse followed by the patient. The aim of AIUEO therapy is to improve speech so that it can be understood by others by moving the lips, tongue, and facial muscles, and pronouncing words (Astriani et al., 2019). Blowing-pipe therapy (oral-motor therapy) is a therapy used to train the muscles of the mouth, jaw, and tongue using biting and blowing methods (Ary, 2019).

METHOD

The method used in writing this scientific work uses a descriptive analysis case study approach related to the implementation of evidence-based nursing (EBN) during nursing practice with several stages consisting of (1) raising questions (PICO), (2) looking for related evidence, (3) assessment of the evidence found, (4) implementation of the evidence obtained, and (5) evaluation of the implementation of evidence-based nursing.

The sample used by the researcher was a male client with compensatory consciousness who was diagnosed with a non-hemorrhagic stroke with left hemiparesis and experienced verbal communication disorders, especially dysarthria. The instrument used in the research to measure an increase in verbal communication skills is Tikofsky's 50-word intelligibility test score where the percentage rating value is assessed by multiplying by 2 the results of the words that are successfully pronounced clearly so that the maximum total value of Speech intelligibility is 100.

The first step in the therapy methodology is to provide AIUEO speech therapy by positioning the client in the most comfortable position, then asking the client to warm up the mouth area by puffing out both lips tightly and continuing by puffing out each side of the cheek for 5 seconds each. alternately as follows

Figure 1. Warming up the cheek muscle area

The second warm-up is to stick out your tongue as far as possible and encourage touching your chin and touching your nose as follows

Figure 2. Warming up the tongue muscles

The first therapy begins by pronouncing vowel letters starting from the letters A-I-U-E-O as follows:

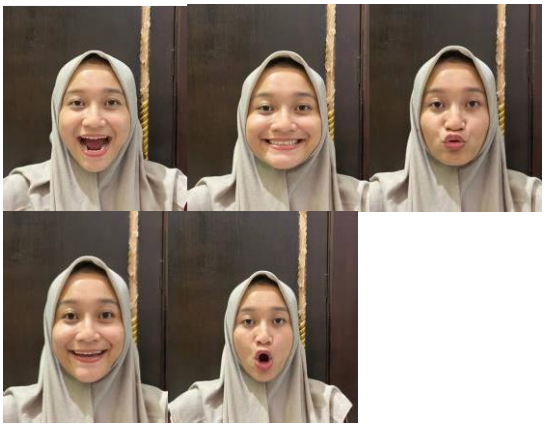


Figure 3. A-I-U-E-O therapy

The second therapy is continued by providing blowing-pipe therapy which begins with regular breathing (inspiration and expiration) 10 times each at the beginning and end of the balloon-blowing therapy, then at the core of the therapy is encouraging the client to breathe by ending with blowing the balloon during the phase. Expiration until the balloon inflates for 10 minutes as follows

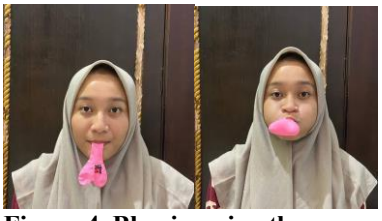


Figure 4. Blowing pipe therapy.

RESULT

Case Report

The patient was a man, 50 years old, who felt that his left limb was starting to experience weakness on 07/30/23 at 23.00 WIB. At the time of the assessment on July 31 2023 at 15.00 WIB the patient said the dizziness had reduced but the patient still complained of weakness in the left limb. The patient also seems to still have difficulty pronouncing words with clear articulation (slurred). The patient has a history of uncontrolled hypertension and high uric acid for a long time. Apart from that, there is a family history of hypertension, namely from the mother. In the functional assessment, the patient immediately checks his condition when weakness in the left limb occurs. According to him, pain is a condition when you can no longer hold back the feeling of discomfort. The patient only finished 3 spoons or a quarter of his food due to difficulty swallowing and decreased appetite. The patient is still drinking well, approximately 500ml per day. However, the patient admitted that it was quite difficult for him to swallow due to weakness in the left side of his face and he occasionally choked. The patient uses a bedpan every time he has to defecate and has not been able to defecate since the patient was sick. All the patient's needs are currently completely assisted by his wife (Barthel Index: 0) (Activity Daily Living (ADL): total assistance). The patient said it was difficult to sleep because his feet sometimes hurt and the environment was noisy. Patients sometimes suddenly interrupt the conversation and divert to a new topic that is less relevant to the topic being discussed. Since becoming ill, the patient's role as husband and father has been hampered due to limited mobility.

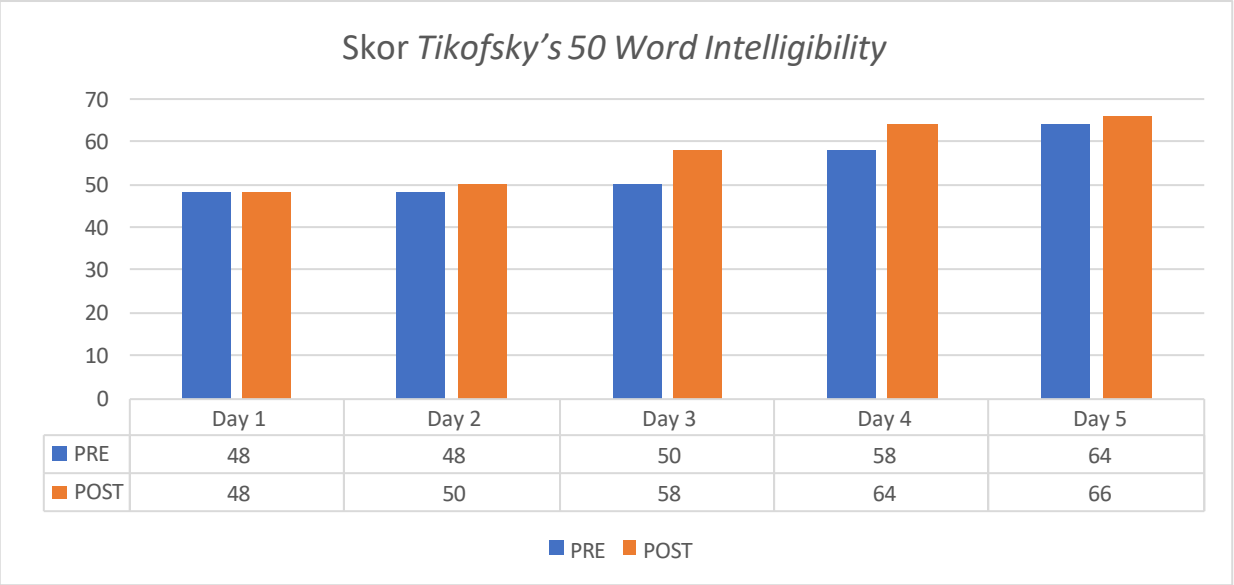
On physical examination, the patient's general condition looked weak, the client appeared to be drooling, the patient was sweating, the face was pale, a 3 lpm nasal cannula was installed, compensatory consciousness, GCS 15 (E: 4, M: 6, V: 5), blood pressure 152/115mmHg, Pulse 97x/minute, RR: 24x/minute, SpO2: 98% (NK 3lpm), Temperature 36.50C, BB 60kg and TB 155cm (BMI: 22 normal). Examination of the upper and lower extremities showed weakness in the left upper and lower extremities, muscle strength on the left side was a score of 0 and there was movement restriction due to weakness of the left limb, warm acral, good skin turgor, and CRT < 3 sec.

In supporting examinations, blood tests showed high leukocyte results of 15.2 103/ul, low eosinophils 0%, high segment neutrophils 81%, low lymphocytes 13%, high total cholesterol 226.1 mg/dL, high creatinine 1.82 mg/dL, and high uric acid 9.40 mg/dL. CT scan results showed a cerebral infarction in the right parietal lobe; orbital cavity, nasal cavity, and paranasal sinuses good mastoid pneumatization; no visible cerebral/intra ventricular/ subarachnoid hemorrhage; no visible epidural/subdural hematoma; the median structure in the middle does not deviate; symmetrical ventricular system; There is no visible cerebral mass, and it is suicy

widening due to cerebral atrophy. The FAST test is F (Face): the face looks down on the left and is not very symmetrical, A (Arm): unable to raise the left arm, S (Speech): Speech is not clear (slurred), and T (Time): the patient goes straight to Hospital after experiencing weakness in the left limb. Nerve weakness occurs in N.7 (Facial): facial expressions, N.9 (glossopharyngeal): tongue and pharynx, and N.12 (hypoglossal): muscles under the tongue. Tikofsky's 50-word intelligibility score: 48 (dysarthria test).

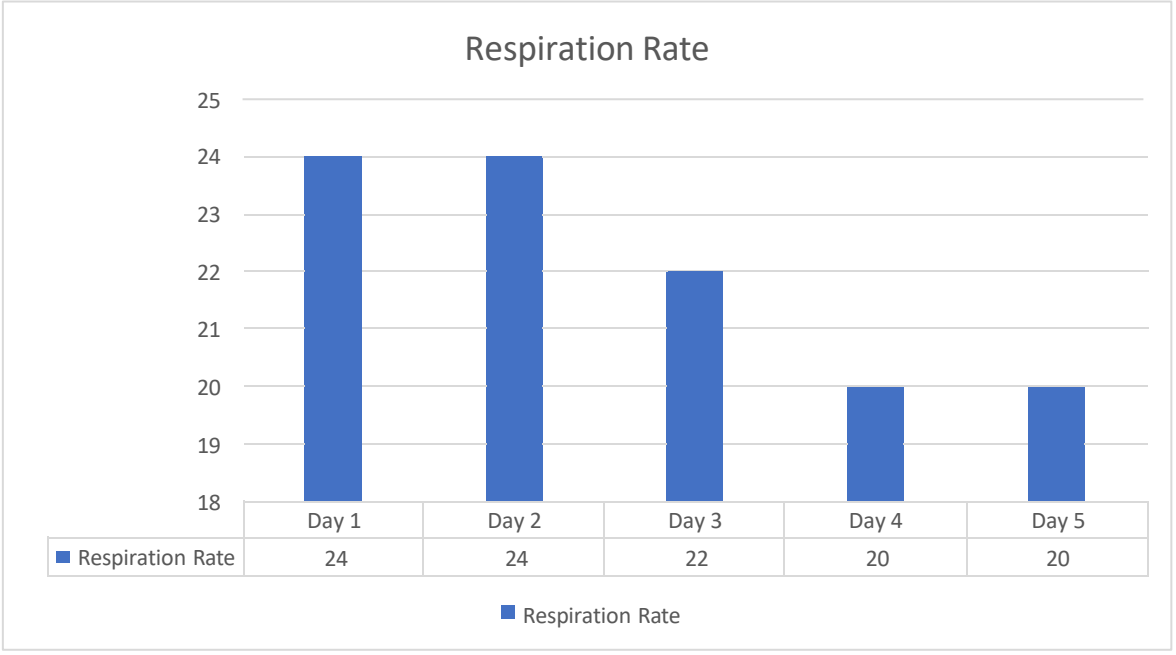
From the case description that has been presented, the main nursing diagnosis that can be established in the case above is Verbal Communication Disorder (D.0119) b.d Neuromuscular disorder. The nursing intervention given is based on the diagnosis raised, namely promoting communication by monitoring speed, pressure, quality, and volume of speech; providing speech therapy (AIUEO speech therapy and blowing pipe), modifying the environment to minimize assistance, providing psychological support, and encourage speaking word by word slowly and clearly. AIUEO speech therapy and blowing pipe are the latest combination breakthroughs which were previously implemented separately to overcome the problem of verbal communication disorders, especially dysarthria. This method can reduce the severity of dysarthria and can increase patient motivation. Implementation of AIUEO speech therapy and pipe blowing was carried out in the Lily Room at Dr. RSUD. R. Goeteng Taroenadibrata Purbalingga on 01 August 2022 to 05 August 2023. The inclusion criteria for patients who will be taken are stroke patients who experience dysarthria, patients who are willing to be given AIUEO speech therapy and blowing pipes to overcome their dysarthria, and patients who have never received therapy implementation AIUEO talk and blowing pipe beforehand. Meanwhile, the exclusion criteria are patients with decreased consciousness and patients who are uncooperative. After the selection was carried out based on inclusion criteria, we found one stroke patient with verbal communication problems who spoke slurredly.

Before being given the AIUEO speech therapy intervention and blowing-pipe therapy, the patient was tested for the degree of dysarthria using Tikofsky's 50-word intelligibility so that an initial dysarthria score was obtained before the intervention was carried out to see any changes. Next, the patient is given an explanation of how to carry out AIUEO speech therapy and blowing-pipe therapy. After that, the patient was evaluated by being tested again using Tikofsky's 50-word intelligibility to see an increase in clear articulation of words. The results of the evaluation of the results of the nursing intervention carried out for 5 days, which were carried out in the morning and evening, were that there was an increase in verbal communication, with the criteria for speaking ability being 2 (moderately decreased) to 4 (moderately increased), slow 2 (quite increased) to 4 (moderately decreased), dysarthria 2 (moderately increased) to 4 (moderately decreased). Tikofsky's 50-word intelligence score increased, from 48 to 66.



Graph 1. Tikofsky's 50-Word Intelligibility Test Score Before and After Therapy

Based on the graph above, it can be seen that on the first day after being given the AIUEO speech therapy intervention and blowing-pipe therapy, the score was still the same as before the intervention was given, which means there was still no improvement in the ability to pronounce articulated words clearly. However, from the second day to the fifth day, the score increased from 48 to 66, which means it continues to increase every day. Apart from that, the patient also said that the therapy given made the patient more relaxed in speaking and chewing food, unlike before the therapy was given the patient felt very stiff. Patients began to feel more comfortable and relaxed and admitted that they were able to do it independently because the therapy given was quite easy.



Graph 2. Respiration Rate During Therapy

Based on the graph above, it can be seen that the patient's respiratory frequency is improving gradually. On the first day, the patient's respiratory frequency was 24x/minute with SpO2 results (98%) but he was still using nasal cannula oxygen at 3

lpm. On the second day, the respiratory frequency was still 24x/minute with SpO2 results (98%) but the administration of nasal cannula oxygen was reduced to 2 lpm. On the third day, the patient's respiratory frequency appeared to have decreased to 22x/minute with SpO2 results (99%) and he was no longer using nasal cannula oxygen. The fourth and fifth days showed that the patient's respiratory frequency was getting better, namely 20x/minute with SpO2 results of (98%) and (99%) respectively.

DISCUSSION

Dysarthria is a common symptom that often occurs in stroke sufferers. Dysarthria appears as a result of nerve weakness after several examinations of the brain's nerves in the trigeminal nerve (N.5). The client's jaw ability is weak on the left because the patient has difficulty pronouncing words clearly. In the glossopharyngeal nerve (N.9), there is a tongue problem. and the pharynx, which is a problem with swallowing fluids, as evidenced by the patient drooling on one side of the left side, and the hypoglossal nerve (N.12), which is a problem with the muscles under the tongue, which is characterized by the pronunciation of consonant words that cannot last for a long time. There are 5 components needed for the speech process, namely articulation, resonance, phonation, prosody, and breathing. However, cooperation from other organs is needed so that a person can speak clearly, namely the lips, tongue, teeth, glottis, mandible, maxilla, velum, cheeks, hard palate, uvula, and alveolar rim (Cornelis & Sengkey, 2021). Treatment of dysarthria usually involves a series of exercises aimed at improving the strength and control of the articulatory muscles and the use of alternative language techniques to improve speech intelligibility (Perrotta, 2020).

Treatment that can be carried out for dysarthria sufferers is the routine application of AIUEO speech therapy and blowing-pipe. According to the American Speech Language Hearing Association (2016), Speech therapy is a form of professional health service based on science, and technology in the fields of language, sound, speech, rhythm/fluency, and swallowing aimed at individuals, families, and/or groups to improve health efforts. caused by anatomical, physiological, psychological, and sociological disorders/abnormalities. Stroke patients who experience dysarthria can be given AIUEO therapy which aims to improve speech so that it can be understood by others by moving their lips, tongue, and facial muscles, and pronouncing words (Astriani et al., 2019). Blowing-pipe therapy is actually a motor therapy that involves speaking organs such as the tongue, lips, and jaw. Motor therapy includes blowing balloons, blowing trumpets, playing with rubber bands with straws, and others (Rizkiani, 2021).

The results of this case study show that after implementing AIUEO speech therapy and blowing pipe for 5 days, the severity of dysarthria can decrease gradually every day from previous Tikofsky's 50-word intelligence score of 48 to 66. Apart from that, the patient also admitted to feeling more relaxed. and not stiff from the previous day. The evaluation results on the last day showed that the patient was able to pronounce more words with correct articulation than the previous day, Tikofsky's 50-word intelligence score reached 66, and he did not speak slurredly. This is supported by research by Oktaviani Djabar et al (2022) which states that the application of AIUEO therapy is effective in improving clients' speaking abilities as evidenced by an increase in the FAST assessment from 25 to 29. Apart from that, Ary's research (2019) also states that blowing therapy- pipe is able to improve the patient's ability to pronounce word for word based on the results of Tikofsky's 50-word intelligibility test score from 48 words to 64 words.

This was also supported because the patient's respiratory frequency had improved from previously RR: 24x/minute and SpO2: 98% (NK 3lpm) to RR: 20x/minute and SpO2: 99% (FA). Based on the functional components that make a person able to speak well, breathing is one of the treatments to support the functional components of speaking. This is confirmed by Perrotta (2020) who states that treatment for dysarthria begins with correct breathing management and then continues with specific activities that enable patients to improve their skills in articulation,

resonance, phonation, diakinesis, speech prosody, and rhythm. According to the book TEDYVA (Rahmi & Yuli Afmi, 2021), it is said that a normal inhalation or exhalation of breath can be held for at least 5 seconds. Meanwhile, in the case above, in 60 seconds the patient was able to breathe 24 times so the patient's inhalation and exhalation only lasted in the range of 2-3 seconds, this means the client's breathing was short.

CONCLUSION

AIUEO and blowing-pipe speech therapy interventions can reduce the severity of dysarthria as evidenced by an increase in Tikofsky's 50-word intelligibility test score from 48 to 66. This speech therapy intervention is also able to reduce muscle stiffness in the facial area and speech organs. After performing speech therapy, patients feel more relaxed and have no difficulty pronouncing word by word. The results of the latest observations showed that the patient was able to pronounce more words with correct articulation than the previous day, Tikofsky's 50-word intelligence score reached 66, the respiratory frequency was 20x/minute, SpO2 was 99% (FA) and his slurred speech had decreased.

It is hoped that this writing can be used as a reference and applied in providing nursing care to stroke patients with a patient diagnosis of verbal communication disorders with dysarthria so that it can be a reference in reducing the severity of dysarthria and increasing patient motivation.

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