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95. Availability, Accessibility, and Acceptability of Health Services in Remote Indigenous Community of the Baduy Dalam Tribe 519
Asri Nur Maulidya, Dumilah Ayuningtyas
96. The Effectiveness of Applying Score System in Growth Chart to Predict Stunting and Improve Nutritional Knowledge of Pre-Schoolers' Mother in Indonesia 525
Haripin Togap Sinaga, Abdul Hadi, Alfridsyah, Ichsan, Nelson Tanjung
97. The Relationship between Hypermobility Syndrome and Systemic Lupus Erythematosus 532
Mohammed H. Al-Osami, Sarah Mohammed, Waleed Ibraheem Ali, Hayder Adnan Fawzi
98. Mapping the Model of Ecological Vegetation as Potential Malaria Habitats in a Malaria-Endemic Region in Oesao Village, Kupang Regency, Indonesia 539
Ragu Harming Kristina, Sri Subekti, Yoes P. Dachlan, Santi Martini, Heru Santoso Wahito Nugroho
99. Barriers in Treating Patients with Acute Coronary Syndrome in Indonesia Primary Health Care: A Phenomenological Study 550
Kumboyono Kumboyono, Dini Prastyo Wijayanti, Titin Andri Wihastuti, Septi Dewi Rachmawati, Yulia Candra Lestari
100. Association between Papilledema and Guillian - Barré Syndrome 555
Mohammad A.S. Kamil, Aqeel K. Hatem, Adel M. Abbass, Sajidli. Alhussaini
101. Effect of Sensory and Tactile Stimulation to Increase Glasgow Coma Scale (GCS) Score on Stroke Clients who Have Consciousness Disorders at Abdul Moeloek Hospital, Lampung 562
Purbianto, Dwi Agustanti
102. Liver Function and Some Biochemical Parameters affected by Anabolic Androgen Steroids and Diet Supplements Consuming 566
Enas Abdul Kareem Jabbar, Jamela Jouda, Haider Sabah Abdulhussein, Bassad A. AL-Aboody
103. Relationship between Self-Concept with Women's Premenopause Anxiety in Facing the Menopause, in Pamekasan, East Java 573
Yulianto, Yufi Aris Lestari, Erik Toga, Muh. Al Amin, Asef Wildan Munfadlila, Ahmadi
104. The Effect of Use of Edutainment on Changes in Hemoglobin Levels in Adolescents (Case Study of SMPN 4 Banjarbaru) 579
Nia Kania, Siti Nurhayani, Lenie Marlinae, Nida Ulfah
105. Relationship between Folate Receptor Alpha (FR α) with Estrogen Receptor, Progesterone Receptor, HER-2 Neu Expression in Breast Carcinoma 582
R A Tandjung, Djumadi Achmad, Ni Ketut Sungowati, Muhammad Husni Cangara, Rina Masadah, Berti Julian Nelwan, Prihantono Prihantono
106. Study of Quality of life at Worker User Train **Commuter line** and TransJakarta Busway Bogor - Jakarta 2018 589
David Kusmawan, Indri Hapsari Susilowati, Mufti Wirawan
107. The Effect of Sleep Hygiene and Brain Gym on Increasing Elderly Comfort and Sleep Quality 595
Nursalam, Fitriana Kurniasari S, Elida Ulfiana, Ferry Efendi

Effect of Sensory and Tactile Stimulation to Increase Glasgow Coma Scale (GCS) Score on Stroke Clients who Have Consciousness Disorders at Abdul Moeloek Hospital, Lampung

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ABSTRACT

The stroke prevalence based on the diagnosis of health workers and the symptoms found in Lampung province was 5.4 ‰. This study aimed to determine the effect of sensory and tactile stimulation on increasing Glasgow Coma Scale (GCS) scores in stroke patients who experience decreased consciousness, using experimental quasy designs. The population in this study were stroke patients with decreased consciousness (GCS < 13), with a sample size of 32 respondents. Each respondent was measured for 5 days. The mean GCS score before intervention in the treatment group was 8.31 and the control group was 11.06. After the intervention, the mean GCS score in the intervention group was 8.94 and the control group was 11.12. While the p-value was 0.006, so it was interpreted that sensory stimulation and tactile stimulation can significantly increase the GCS score. It is recommended that nursing practitioners apply sensory stimulation and tactile stimulation in the management of stroke patients who experience impaired consciousness.

Keywords: *Sensory stimulation, Tactile stimulation, Stroke, GCS score*

INTRODUCTION

Stroke is a functional disorder of the brain due to obstruction of blood flow to the brain caused by blockage (ischemic stroke) or brain hemorrhage (hemorrhagic stroke) which can cause nerve paralysis even to death. According to Basjiruddin (2007), in the USA it is estimated that the incidence of strokes per year in the USA is > 700,000 which causes 160,000 (20%) deaths per year. Stroke is the third leading cause of death in industrialized countries and is a major cause of disability in adults. The incidence of stroke is increasing, because the number of people aged > 65 years has increased from 390 million at present to 800 million by 2025⁽¹⁾.

Based on the 2013 Riskesdas data, it is known that there are 12 stroke patients per 1000 population. The prevalence of stroke in Lampung Province based on the

diagnosis of health workers is 3.7 ‰ and based on the diagnosis of health workers and symptoms is 5.4 ‰⁽²⁾.

Stroke is the number one killer disease in Indonesia. People aged > 65 years are most at risk for stroke, but 25 % of strokes also occur in people aged < 65 years, including children. People who smoke, lack exercise, and have a poor diet are also prone to stoke. In addition, people with impaired blood circulation due to high blood pressure, high cholesterol, irregular heartbeat or atrial fibrillation, and diabetes, are also prone to stroke⁽²⁾.

The initial attack of ischemic stroke is generally in the form of impaired consciousness, unconsciousness, confusion, headache, difficulty concentrating, disorientation, while hemorrhagic strokes are usually often accompanied by acute headache and decreased consciousness that develops rapidly to coma⁽¹⁾.

Nursing or non-pharmacological therapies that can be given to patients with coma are to provide sensory stimulation in the form of visual stimulation, olfactory, tactile, gustatory, auditory and⁽³⁾. Sensory stimulation as soon as the symptoms of stroke are detected can prevent widespread damage to the brain area⁽⁴⁾.

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The effects of sensory stimulation, one of which is music therapy can reduce the stimulation of the sympathetic nervous system. The response that arises from the decline in activity is a decrease in adrenaline activity, reduce tension in neuromuscular activity, and increase the threshold of consciousness. Indicators that are commonly measured are decreased heart rate, respiratory rate, stomach acid, and blood pressure⁽⁵⁾.

Campbell (2002) states that hospitals in the world that apply music therapy such as Beth Abraham Hospital in the American Bronx, Charing Cross Hospital in London, music therapy are used during the surgical process. Saint Luke's Hospital in Chesterfield uses music therapy in the field of physical rehabilitation, Saint Mary Hospital's respiratory intensive care unit in Green Bay uses music therapy in order to create a healing atmosphere⁽⁶⁾.

Besides sensory stimulation, tactile stimulation also has important meaning. According to Scanhanberg, touch has power ten times greater than verbal or emotional contact, and touch affects almost everything a person does. There are no other senses that are more stimulating than touch. Researchers now know that certain types of tactile stimuli on the skin, will send a message to the brain, which in turn stimulates the formation of oxytocin and endorphins. Oxytocin strengthens the bond between mother and baby, while endorphin-peptide is related to opiates which creates a feeling of comfort⁽⁷⁾.

In Indonesia, music therapy and tactile stimulation have not been widely applied in Dr. H. Abdul Moeloek hospital also has not applied sensory stimulation and tactile stimulation as one of the alternative therapies in order to cure patients.

MATERIALS AND METHOD

The design of this research was quasi-experimental. The research was conducted on 2 to 31 October 2017 at

Dr. H. Abdul Moeloek Hospital, Lampung, Indonesia. The population of this study were impaired ischemic and hemorrhagic stroke patients (GCS < 13) who were treated in the intensive care unit (ICU) and the Bougainvillea Room of Dr. H. Abdul Moeloek Hospital, Lampung. The sample size of the intervention group and control group were 16, respectively, chosen by accidental sampling technique.

The research intervention instrument was a music player from the VSB - 810 Desktop Bluetooth Speaker using soft volumes without earphones. The data collection instrument about Glasgow Coma Scale (GCS) was an observation sheet. Data collection was carried out using the following procedures: 1) before being given sensory and tactile stimulation, GCS was first measured, 2) music was played to the patient, with a volume that was heard by normal people's ears, for 30 minutes, 3) when the patient listened to music, tactile stimulation was carried out by sweeping tapping technique, that was, the patient's family rubs all of the patient's extremities for 20 minutes, followed by an approximation of pressing all the joints on the extremities for 10 minutes (the family must be trained first, 4) sensory stimulation was performed once a day, morning, afternoon and at night, for 5 days, 5) GCS evaluation was carried out, 6) calculation of the difference in GCS values between pre-intervention and post-intervention in the intervention group and control group. data about awareness level (GCS) is numerical data so it is presented in the form of mean, standard deviation, minimum score and maximum score⁽⁸⁾. The T test with a 95 % confidence interval was used to test the difference in GCS values between the two groups.

FINDINGS

The results of measuring the level of consciousness of patients based on GCS for the intervention group and control group are presented as follows.

Table 1. The level of consciousness of patients based on GCS for the intervention group and control group before the intervention

| Group | Mean | SD | Min – Max | 95% CI |
|-----------------------------|-------|-------|-----------|------------|
| Intervention group (n = 16) | 8.31 | 2.245 | 5-13 | 7.12-9.51 |
| Control group (n = 16) | 11.06 | 2.048 | 7-13 | 9.97-12.15 |

Table 2. The level of consciousness of patients based on GCS for the intervention group and control group after the intervention

| Group | Mean | SD | Min – Max | 95% CI |
|-----------------------------|-------|-------|-----------|------------|
| Intervention group (n = 16) | 8.94 | 2.048 | 5-13 | 7.85-10.03 |
| Control group (n = 16) | 11.12 | 2.125 | 7-14 | 9.99-12.26 |

Table 3. Comparison of changes in GCS mean scores between the intervention group and the control group

| Group | Before | After | Changes in mean score | p-value |
|-----------------------------|--------|-------|-----------------------|---------|
| Intervention group (n = 16) | 8.31 | 8.94 | 0.63 | 0.0006 |
| Control group (n = 16) | 11.06 | 11.12 | 0.60 | |

Based on the table above it can be interpreted that the intervention group has an increase in the average GCS score that is greater than the control group. The T Test results showed p-value 0.006 so it was concluded that there was a significant difference between the GCS mean score of the intervention group and the GCS mean score of the control group.

DISCUSSION

Based on the results of data analysis, there were significant differences in GCS mean scores between the intervention groups who received music therapy and tactile stimulation, with the control group. The results of this study are in line with the results of Asrin's research that music therapy is useful in increasing the status of consciousness of patients with severe head trauma. In addition, music therapy can also provide a positive stimulus to physical and psychosocial responses⁽⁹⁾.

Rosenfeld & Dun (1999) also reported the same thing that music therapy can help patients to restore awareness, communication, some physical abilities, and provide a pleasant experience⁽¹⁰⁾. Auntari (2001) concluded that auditory stimulation is a beneficial thing to encourage healing of head injury patients from coma and increase the level of patient awareness⁽¹¹⁾. The behavioral response of head injury patients with loss of consciousness who are given stimulation of familiar music sounds is greater than patients who are not given music sound stimulation. The above can occur due to the relaxation effect of soft music which is likely to have a positive effect on the brain because of the reticular activating system (RAS) which functions to control alertness or awareness and wake-sleep cycles. For patients with unconscious head

trauma, the only function is the RAS and hypothalamus and as a consequence of the healing process, the higher elements of the brain will begin to function⁽¹⁰⁾.

The effect of sensory stimulation including music therapy is to reduce the sympathetic nervous system stimulation. The response that arises from the decline in activity is decreased adrenaline activity, decreased tension in neuromuscular activity, and increased awareness threshold. Indicators commonly measured are decreased heart rate, respiratory rate, decreased gastric acid, and decreased blood pressure⁽⁵⁾.

When viewed from the mechanism of the relationship between the nervous system and the endocrine system, music stimulation or sound waves can stimulate the activation of dopamine which physiologically plays a role in increasing one's alertness. This is consistent with other studies at McGill University Montreal that "listening to music can trigger the release of dopamine in the body⁽¹²⁾.

In this study, in addition to sensory stimulation patients also received tactile stimulation. According to Scanhanberg, touch is ten times stronger than verbal or emotional contact, and touch also affects almost everything a person does. There are no other senses that are more stimulating than touch. Researchers now know that certain types of tactile stimuli on the skin, will send a message to the brain that stimulates the formation of oxytocin and endorphins. Oxytocin strengthens the bond between mother and baby, while endorphin-peptide which is related to opiates creates a feeling of comfort⁽⁷⁾.

Tactile stimulation is performed on the skin, muscles, joints with various techniques, namely tapping, swiping, approximation. Tactile stimulation in principle must cause muscle contraction, so that it will stimulate the golgi tendon and muscle spindle. Impulses derived from muscle spindles and tendon organs are sent by conduction fibers that are the most rich in myelin, namely fiber. Other proprioceptive impulses derived from fascial receptors, deeper joints and connective tissue, travel in less myelin fibers. Knocking, swiping, tapping and approximation will stimulate proprioceptors on the skin and joints, the muscle spindle will react by sending the impulse to the anterior motoneuron. Stimulating these neurons causing a brief increase in contraction.

Stimulation of muscle spindles and golgi tendons will be informed through afference to the central nervous system so that they will contribute facilitation and inhibition (gracianin). The tactile stimuli that are repeated will provide information to the “supraspinal mechanism” so that an integrated motion pattern occurs and becomes movements with functional patterns. Tactile stimulation through the peripheral motor nerves exercises “graps” and “release” hand functions and can facilitate muscle weakness in movement.

CONCLUSION

Based on the results of the study it can be concluded that the combination of music therapy and tactile stimulation proved effective to increase consciousness of stroke patients who experience impaired consciousness.

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