

Physiotherapy Management in Cases of Spasticity Hemiparese Sinistra ec Ischemic Cerebrovascular Accident a Case Report

¹Atikah Itsna Zulfatirrohman, ²Adnan Faris Naufal, ³Muhamad Nasuka

¹Physiotherapy Professional Study Program, Faculty of Health Sciences, Muhammadiyah University of Surakarta

²Physiotherapy Study Program, Faculty of Health Sciences, Muhammadiyah University of Surakarta

³Physiotherapy, RSUD RAA Soewondo Pati

Email : j130225026@student.ums.ac.id

Date of Submission: 9 December 2022 ; Receipt date: 2 May 2023

ABSTRACT

A cerebrovascular accident or often referred to as a stroke is a clinical condition that occurs when the circulation of blood flow to the brain is disrupted due to a blockage of blood vessels or due to bleeding. The problem in this case is related to the low LGS value as measured using a goniometer, reduced muscle strength using the MMT value, related to the balance value as measured using the berg balance scale, there is pain as measured using the NRS value and the presence of spasticity as measured by using the Asworth scale, as well as decreased functional ability with the Barthel index and incorrect gait patterns. The physiotherapy intervention given in this study is by giving Infrared, Core stability exercise, Exercise therapy, and Gait Retraining Exercises. This research method uses a case report. The result is an increase in the value of LGS, MMT, berg balance scale, and there is a reduction in the value of pain, spasticity and improvement in gait patterns. But there is no change in the value of functional ability.

Keywords: *Stroke, Ischemic, Spasticity, Hemipares, Physiotherapy Intervention.*

ISSN 2722-9610

E – ISSN 2722-9629

INTRODUCTION

Cerebrovascular accidents or often referred to as a stroke is a clinical condition that occurs due to the circulation of blood flow to the brain being disrupted or stopped. This can be caused due to occlusion of blood vessels (ischemic/non hemorrhagic) or due to bleeding (hemorrhagic), so that the cells in the brain are damaged and disrupt the function of the brain related to that area and cause physical problems (Indaryani, Sutri Yani, 2020).

Problems that occur in stroke patients can include muscle weakness, abnormal muscle tension, limited movement patterns, lack of cognition, loss or decreased sensation, motor disturbances, posture deficits, aphasia, and balance and gait disturbances (Ynag & Uhm, 2020).

One of the changes caused by stroke is the emergence of spasticity. Spasticity is a clinical manifestation of damage to the brain in the

Upper Motor Neuron or UMN, this causes a worsening state of function with changes that occur such as fibrosis, stiffness and atrophy.(Doussoulin et al., 2020). Spasticity is a motor disorder characterized by an increase in speed-dependent muscle tone (Sandy et al., 2020).

According to Venketasubramanian et al (2022), Cerebrovascular accident is one of the main causes of death and disability in Indonesia. With a prevalence in rural areas of 0.0017% and 0.022% in urban areas. The overall prevalence is 10.9/1,000,000 Indonesian population.

Unmodifiable risk factors for stroke are age, gender, race, and genetics. Meanwhile, modifiable risk factors for stroke are hypertension, diabetes, hyperlipidemia, heart disease, lifestyle, diet/nutrition, obesity, alcohol consumption, smoking, inflammation and infection (A. Boehme, C. Esenwa, 2018).

Physiotherapy interventions in stroke patients aim to improve and restore optimal functional abilities (Krisnawati & Anggiat, 2021). In this study researchers used Infrared intervention to improve blood circulation (Isnaini & Rahman, 2021), Core stability exercise to improve muscle strength and balance (Song & Heo, 2015), Exercise therapy: to reduce spasticity, increase LGS and maintain LGS (Krisnawati & Anggiat, 2021), as well as gait retraining exercises or correct walking patterns accompanied by proprioceptive exercises (Beyaert et al., 2015).

METHOD

The research method used in this study is to use the case report method. A case report is a case report study that aims to describe a case, in terms of diagnosis, clinical manifestations, pathophysiology, prognosis, as well as therapy and clinical results obtained. (Murti, 2012). This case study was conducted when the author had the opportunity to practice the physiotherapy profession at the Soewondo Paati Regional General Hospital, Central Java which is located at Jl. Dr. Soesanto No. 114, Ngipik, Kutoharjo Village, Pati District, Pati Regency, Central Java on January 2-26 2022. The cases taken were poly patients on behalf of Mrs. K, who is female, was 43 years old at the time of the study and was Muslim. The patient is a housewife who works as a seamstress at her house, Bumiharjo Rt 03 Rw 03 winong Pati, who has a disorder due to an Ischemic Cerebrovascular Accident.

In accordance with the physiotherapy management process, before taking action, anamnesis and assessment is carried out on the patient. Anamnesis is done by auto history or asked directly to the patient because the patient does not experience cognitive impairment. Furthermore, an assessment is carried out in order to examine the patient, whether it is checking vital signs, physical examination, basic movement examination, and other supporting examinations. After the examination, a physiotherapy diagnosis was formulated, namely related to impairment, activity limitation, and participation restrictions. Then an action plan for intervention is made, then the implementation of the intervention is then evaluated.

Anamnesis

The patient complained of weakness and stiffness in the left upper and lower limbs. On October 3, after waking up in the morning, the patient's left limb suddenly became weak and could not be moved. Then in the afternoon he was taken to RSUD RAA Soewondo Pati, then his blood pressure was checked, the result was 160/100 mmHg because the patient did have a history of hypertension. then a CT scan was performed and the result was a blockage in the right side of the brain so that he was diagnosed with a left ischemic cerebrovascular accident or a left non-hemorrhagic stroke.

Inspection

In the musculoskeletal system, the patient complained of weakness in the upper limbs so that he felt it was difficult to lift his left upper arm and upper leg and felt stiff so it was difficult to straighten his forearm and left lower leg. The patient's verbal communication is good, the quality of hearing is also good and the quality of vision is good.

At the time of the static inspection examination it was seen that the patient's left hand tends to internally rotate the shoulder adduction, elbow flexion, and wrist flexion, and the phalanges.

During dynamic inspection it is seen that the patient has difficulty straightening and opening his left forearm on his own and when walking the patient has a dragging left walking pattern or no swing phase. And walk with the help of others.

Palpation examination found no pain and edema, and normal temperature.

On examination of active, passive and isometric basic movement functions of the upper and lower limbs on the right, all of them were capable of full ROM, without pain, without resistance, and had a normal end feel, and were able to move against maximum resistance. Whereas the upper and lower limbs on the left are unable to go full ROM and there is resistance due to spasticity, so the end feel is problematic and also unable to resist resistance due to weakness.

Patients have good cognitive ability, because they are able to understand and do what is instructed by the therapist. Patients are also able to communicate well and are able to tell the history of the disease, and the complaints that are felt. Intrapersonal the patient is also very eager to recover and restore the function of his left upper and lower limbs. As well as Interpersonal patients who are cooperative and open to therapists, and actively ask questions and are willing to accept and carry out suggestions and assignments from the therapist.

Functional abilities and activities The patient can carry out activities of daily living with assistance, walking with a handrail or being assisted by another person for fear of falling. The patient has a little difficulty when wearing clothes and pants on the left hand and leg. The patient is unable to wear his own socks. The patient has difficulty carrying something in his left hand. The patient's activity environment is very supportive, the patient's family, especially her husband, pays attention to the patient's condition by bringing him to physiotherapy for the patient's recovery.

Findings on pain examination as measured using the NRS (Numeric Rating Scale) scale, the patient does not feel pain when silent but feels pain when moving in a spastic area while resisting pulling with a value of 4, and there is no tenderness.

The patient's muscle strength was measured using the MMT on the right upper and lower limbs with a value of 5, namely being able to move actively against gravity and maximum resistance. Meanwhile, the left limb that is spastic has a muscle strength value of 3 and the others are 4.

Specific examination to measure spasticity, measured using the Asworth scale. On the right side there is no spasticity or a value of 0, while on the left side of the upper limb there is spasticity with a value of 2, namely the external abductor rotator muscles of the shoulder, extensor elbow, and dorsal flexor wrist with an interpretation of a value of 2, there is an increase in tone which is characterized by difficulty moving passively but it is still easy to move in several parts, while in the left lower limb there is spasticity with a value of 1 in the extensor knee and dorsal flexor ankle muscles with an

interpretation of a value of 1, namely there is a slight increase in tone which is indicated by minimal resistance at the end of the movement.

Functional activity assessment was measured using the Barthel index scale with a result of 16, namely mild dependence. As for the measurement of balance, it is measured using the berg balance scale with a result of 26, which is a medium fall risk.

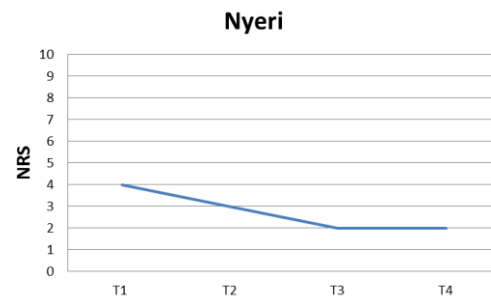
Physiotherapy Intervention

Patients are given physiotherapy measures in the form of giving Infrared to improve blood circulation, Core stability exercises to increase muscle strength and balance, Exercise therapy: to reduce spasticity, increase LGS and LGS maintenance as well as Gait retraining Exercises or correct walking patterns accompanied by proprioceptive exercises. This intervention was given 4 times of therapy which was carried out for 2 weeks. The long-term goal of providing this intervention is intended to improve the patient's functional abilities.

RESULTS

Pain Evaluation with Numeric Rating Scale(NRS)

The Numeric Rating Scale (NRS) is an assessment of pain intensity that has high validity and reliability. The NRS consists of 11 points, from 0 which indicates no pain, to 10 which means severe and unbearable pain.(Alghadir et al., 2018).



Picture 1. Evaluation of pain using the NRS

The results of the evaluation of motion pain in spastic areas using the NRS scale from T1 to T4 have decreased. This decrease in pain is caused because the muscles begin to be flexible so that the pull from the spastic muscles is also reduced and the pain decreases.

Evaluation of the Scope of Motion of the Joints (LGS) with a goniometer

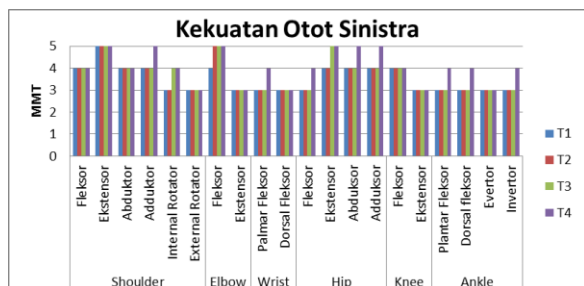
| Regio | Dekstra | Sinistra | | | |
|----------|------------|------------|------------|------------|------------|
| | | T1 | T2 | T3 | T4 |
| Shoulder | S 50-0-170 | S 50-0-165 | S 50-0-165 | S 50-0-170 | S 50-0-170 |
| | F 170-0-75 | F 95-0-65 | F 95-0-65 | F 95-0-65 | F 95-0-65 |
| | R 90-0-80 | R 80-0-75 | R 80-0-75 | R 80-0-75 | R 80-0-75 |
| Elbow | S 0-0-150 | S 10-0-125 | S 10-0-125 | S 10-0-125 | S 10-0-125 |
| Wrist | S 50-0-60 | S 30-0-60 | S 30-0-60 | S 30-0-60 | S 30-0-60 |
| Hip | S 15-0-125 | S 15-0-120 | S 15-0-120 | S 15-0-125 | S 15-0-125 |
| | F 45-0-15 | F 45-0-15 | F 45-0-15 | F 45-0-15 | F 45-0-15 |
| Knee | S 0-0-135 | S 0-0-130 | S 0-0-130 | S 0-0-130 | S 0-0-135 |
| Ankle | S 20-0-35 | S 15-0-30 | S 15-0-30 | S 15-0-30 | S 20-0-30 |
| | R 30-0-20 | R 30-0-20 | R 30-0-20 | R 30-0-20 | R 0-20 |

Picture 2. Evaluate the LGS value using a goniometer

Measurement of the range of motion of this joint is carried out in an active motion. The right side is capable of full ROM, while the left side has limited joint motion. This is because there is spasticity, stiffness, and weakness in the left limb. However, after the 3rd exercise was given, there was an addition of LGS in the sagittal field of the shoulder region and hip region. And after the 4th LGS therapy in the knee region and ankle region, the sagittal plane became full ROM.

Evaluation of Muscle Strength with Manual Muscle Testing (MMT)

Examination of muscle strength is carried out using Manual Muscle Testing (MMT) which consists of a value of 0 to a value of 5. The interpretation of the assessment is that the value 0 is no tone and there is no contraction, the value 1 is tone but there is no movement contraction, the value 2 is there is tone movement contraction, value 3 is a movement capable of resisting gravity, value 4 is a movement capable of resisting gravity and able to resist minimal resistance, and value 5 is a movement capable of opposing gravity and able to resist maximum resistance(Gerhanawati, 2021).

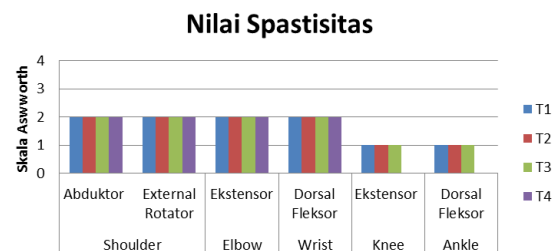


Picture 3. Evaluation of muscle strength with MMT values

The results of the implementation of physiotherapy related to muscle strength in the right part of T1-T4 are worth 5 so that physiotherapy management is aimed at preventing a decrease in muscle strength in that area. Meanwhile, on the left side, the increase in muscle is the adductor internal rotator muscles of the shoulder, flexor elbow, hip region, and plantar dorsal flexor invertor ankle. in a muscle that is spastic there is no increase in muscle strength because there is still resistance or tension when moving the muscle.

Evaluation of spasticity with the Asworth Scale

The Asworth scale is a scale used to measure spasticity which consists of a value of 0 to a value of 4. The interpretation of the value is 0 There is no increase in muscle tone, 1 There is a slight increase in muscle tone which is indicated by the minimum resistance at the end of the movement during flexion and extension, 1 + There is a slight increase in tone as indicated by the presence of minimal resistance along less than half of the ROM 2 A more marked increase in muscle tone in most movements, but still mobile in some parts 3 A more marked increase in muscle tone as indicated by the presence of resistance strong, and passive movement difficulties, and a value of 4 is the occurrence of rigidity in the muscles and cannot be moved(Ahmad Puzi et al., 2017).



Picture 4. Evaluation of the value of spasticity using the Asworth scale

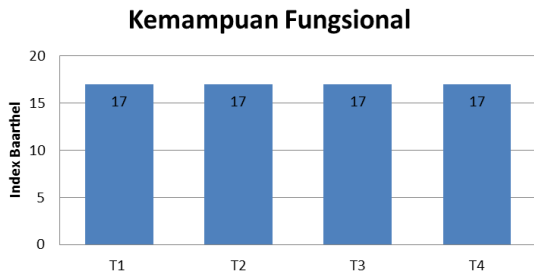
After being given four times of therapy, the spasticity value in the left limb decreased only in the lower extremity during the 4th therapy. That is, the initial value was 1 to 0 or the spasticity disappeared. Whereas in the upper extremities, there was no decrease in spastic values, which remained at a value of 2.

These results indicate that the difference in spastic values is greater and there is no change

and it takes longer to reduce spasticity compared to those with lower spastic values.

Evaluation of functional capabilities with the Barthel index

The Barthel index assessment contains 10 assessment criteria, namely eating, bathing, dressing, dressing, defecating, urinating, using the toilet, transferring, mobility and using stairs with a maximum score of 20 with independent interpretation, a value of 12-19 Mild Addiction, 9-11 Moderate Addiction, 5-8: Severe Addiction and 0-4: Total Dependence(Maharani Ganing et al., 2016). The Barthel index assessment is carried out by asking the patient directly about the functional abilities that the patient can or cannot perform.



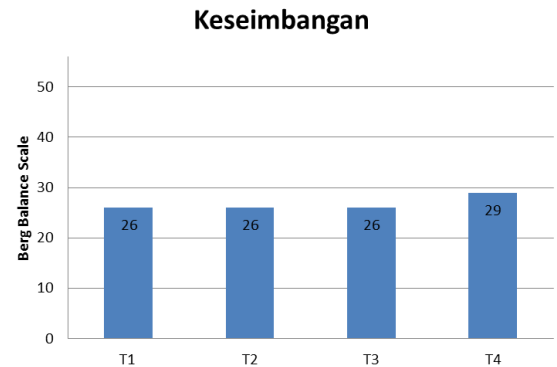
Picture 5. Evaluate the value of functional ability using the Barthel index

The graph above shows that the patient's functional abilities from therapy 1 to therapy 4 did not increase, still had a value of 17 with a minimal dependency interpretation. Patients only depend on the time of transfer, mobility and up and down stairs. This is because the patient has an excessive fear of the risk of falling.

Evaluate balance with the berg balance scale

Measurement of balance is assessed using the berg balance scale. This scale consists of 14 static and dynamic balance test items. The test includes the patient's ability to move from sitting to standing, standing unsupported, sitting unsupported, standing to sitting, transfers, standing with eyes closed, standing with feet together, reaching for objects in front of you with arms outstretched to the maximum, picking up objects on the floor, turn to look back, make a 360-degree turn, place alternate feet on a step stool, stand with one foot in front of the other, and stand on one foot. The interpretation of the assessment is that 0-20 has a high risk of falling,

21-40 has a moderate risk of falling, and 41-56 has a low risk of falling.(Mulyanto et al., 2022).



Picture 6. evaluate the balance value using the berg balance scale

Related to the patient's fear of falling, an evaluation of his balance is also carried out. The berg balance scale assessment is carried out directly to the patient. It turned out that after giving four treatments there was an increase in the Berg balance scale value in the fourth therapy. The total score which was originally 26 increased to 29. The score increased by 3, namely when sitting to standing, standing unsupported, and changing places/transfers. However, the interpretation of these results remains the same, namely the risk of falling is medium.

DISCUSSION

Giving Infra red in reducing pain

Infra Red administration in stroke cases is given to weak and spastic areas with the patient sleeping on his back for 10 minutes, with a distance of 45-60 cm, and the intensity according to the tolerance of the patient. The purpose of administering infrared modality is to reduce pain, because there is a vasodilation effect in the blood vessels so that blood flow can flow smoothly, as a result the muscles become flexible, and pain is reduced(Isnaini & Rahman, 2021).



Picture 7. Infrared (Susanti, 2022)

Providing core stability exercise in increasing balance



Picture 8. Bridging Exercises (Ynag & Uhm, 2020)

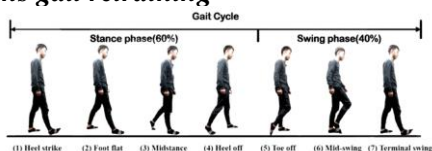
Core stability exercise What is given to stroke patients is bridding exercises. This exercise has several objectives, namely to stabilize, activate and strengthen the core or trunk muscle groups. Another purpose of Core stability exercise is to improve balance, reduce the risk of falling, and stabilize when walking (Song & Heo, 2015).

This exercise is performed with the patient sleeping on his back on the bed, then the patient is instructed to 600 hip flexion, 900 knee flexion between the two opened with a distance like shoulder width, this exercise is performed within 30 minutes, maintained 0-15 seconds and rest for 10 seconds 10x repetitions done in 3 sets with a break between sets of 60 seconds (Ynag & Uhm, 2020).

Providing Exercise therapy in reducing spasticity, adding LGS and strengthening muscles

The exercise therapy provided includes strengthening: to strengthen muscle strength. This exercise is performed by providing resistance to the muscles and then the patient is asked to move the joint against this resistance. This exercise is performed 1-3 sets, 10-15 repetitions of 8-10 exercises, and engages major muscle groups. Performed 2-3 times per week, stretching and patterning: to reduce spasticity and increase LGS. This exercise is done 2-3 times per week before or after strengthening exercises by holding each stretch for 10-30 seconds (Krisnawati & Anggiat, 2021).

Provision of gait retraining in improving gait patterns gait retraining



Picture 9. Normal gait cycle (Wang et al., 2022)

Identification of the correct gait pattern is very important in physiotherapy interventions. This exercise is given to the patient by remembering and applying the correct walking pattern repeatedly to form the correct pattern (Beyaert et al., 2015).

The essence of providing physiotherapy interventions in stroke patients is to return body functions back to normal. The exercises given can help the brain's neuroplasticity process, by using the principle of "use and improve" specifically for functional movements and are carried out repeatedly with gradual increase in intensity (Beyaert et al., 2015).

CONCLUSION

Based on the results of giving four times of therapy, namely by giving physiotherapy interventions in the form of *Infrared*, Core stability exercise, Exercise therapy, and Gait retraining Exercise performed on the patient on behalf of Mrs. K, there is an increase in the LGS value as measured using a goniometer, an increase in muscle strength using the MMT, and an increase in the balance value as measured using the berg balance scale and there is a reduction in the pain value as measured using the NRS value and a decrease in spastic value using the Asworth scale. However, there is no change in functional ability in the Barthel index and the patient begins to apply the correct gait pattern.

SUGGESTION

Suggestions for patients from this study are to continue the exercises given by the therapist, and also use the left limb to carry out activities, and get used to walking in the correct pattern.

This study still has limitations and deficiencies, so further research is needed related to the Spasticity Hemiparese Sinistra ec Ischemic Cerebrovascular Accident Case.

REFERENCES

- A. Boehme, C. Esenwa, ME (2018). Stroke: Risk factors and prevention. Journal of the Pakistan Medical Association, 60(3), 412. <https://doi.org/10.1161/CIRCRESAHA.116>

.308398.Stroke

- Ahmad Puzi, A., Sidek, SN, Mat Rosly, H., Daud, N., & Md Yusof, H. (2017). Modified Ashworth Scale (MAS) Model based on Clinical Data Measurement towards Quantitative Evaluation of Upper Limb Spasticity. IOP Conference Series: Materials Science and Engineering, 260(1). <https://doi.org/10.1088/1757-899X/260/1/012024>
- Alghadir, AH, Anwer, S., Iqbal, A. 8. . P.-0012-0053 (1). pd., & Iqbal, ZA (2018). Test-retest reliability, validity, and minimum detectable change of visual analog, numerical rating, and verbal rating scales for measurement of osteoarthritic knee pain. *Journal of Pain Research*, 11, 851–856. <https://doi.org/10.2147/JPR.S158847>
- Beyaert, C., Vasa, R., & Frykberg, GE (2015). Post-stroke gait: Pathophysiology and rehabilitation strategies. *Neurophysiologie Clinique*, 45(4–5), 335–355. <https://doi.org/10.1016/j.neucli.2015.09.005>
- Doussoulin, A., Rivas, C., Bacco, J., Sepúlveda, P., Carvallo, G., Gajardo, C., Soto, A., & Rivas, R. (2020). Prevalence of Spasticity and Postural Patterns in the Upper Extremity Post Stroke. *Journal of Stroke and Cerebrovascular Diseases*, 29(11). <https://doi.org/10.1016/j.jstrokecerebrovasdis.2020.105253>
- Gerhanawati, I. (2021). Case Study: Physiotherapy Program in Myogenic Low Back Pain. *Journal of Nursing Muhammadiyah*, 6(3), 191–195.
- Indaryani, Sutri Yani, HB (2020). Increasing Physical Mobility with Exercise Program Management in Non-Hemorrhagic Stroke Patients. 3(1), 1–10.
- Isnaini, & Rahman, I. (2021). Physiotherapy Management in the case of Hemiparesis Dextra EC Stroke Infarction with Modality, Infrared, Assistive Active Exercises and
- Zulfatirrohman, I.A., Naufal, A.F. & Nasuka, M. *Fisiomu.2023* Vol 4(3)
DOI: <https://10.23917/fisiomu.v4i3.20738>
Balance Exercises at Pindad Hospital, Bandung City. *Physiotherapy Management in Cases of Hemiparesis Dextra EC Stroke Infarction With Modality, Infrared, Assistive Active Exercises And Balance Exercises At Pindad Hospital*, 4 No. 2, 11.
- Krisnawati, D., & Anggiat, L. (2021). Exercise therapy in stroke conditions: a review of the literature. *Indonesian Journal of Applied Physiotherapy*, 1(1), 1–10.
- Maharani Ganing, SN, Subadi, I., & Sugianto, P. (2016). Barthel Index Score in Stroke Patients Increases After Undergoing Medical Rehabilitation. *Folia Medica Indonesiana*, 51(4), 281. <https://doi.org/10.20473/fmi.v51i4.2860>
- Mulyanto, F., Wahyuni, W., Anwar, T., & Rahman, F. (2022). The Effect of Balance Exercise on the Balancing Ability of Non-Hemorrhagic Post Stroke Elderly : Case Report. *Journal of Health and Society*, 2(2), 19–25.
- Murti, B. (2012). Study design. Doctoral Medical Study Program Matriculation - FKUNS, 1–13.
- Sandy, AA, Fakhurrazy, & Sanyoto, DD (2020). Relationship between Lesion Location and Degree of Spasticity in Ischemic Stroke Patients at Ulin General Hospital, Banjarmasin. *Journal of Medical Education Students*, 3(2), 153–160.
- Song, G. Bin, & Heo, JY (2015). The effect of modified bridge exercise on balance ability of stroke patients. *Journal of Physical Therapy Science*, 27(12), 3807–3810. <https://doi.org/10.1589/jpts.27.3807>
- Susanti, N. (2022). Case Study: Physiotherapeutic Management of Left Hemiparesis Non-Hemorrhagic Post Stroke Conditions With Infra Red Modality and Exercise Therapy. *PENA Journal*, 36(2), 98–109.
- Venketasubramanian, N., Yudiarto, FL, &

- Taskworo, D. (2022). Stroke Burden and Stroke Services in Indonesia. *Cerebrovascular Diseases Extra*, 12(1), 53–57. <https://doi.org/10.1159/000524161>
- Wang, FC, Chen, SF, Li, YC, Shih, CJ, Lin, AC, & Lin, TT (2022). Gait Training for Hemiplegic Stroke Patients: Employing an Automatic Neural Development Treatment Trainer with Real Time Detection. *Applied Sciences* (Switzerland), 12(5). <https://doi.org/10.3390/app12052719>
- Ynag, D. -J., & Uhm, Y. -H. (2020). Effects of Various Types of Bridge Exercise on the Walking Ability of Stroke Patients. *The Journal of Korean Physical Therapy*, 32(3), 137–145. <https://doi.org/10.18857/jkpt.2020.32.3.137>