
Effectiveness of Mirror Therapy Against Upper Limb Muscle

by Abu Bakar

Submission date: 04-Nov-2020 01:02PM (UTC+0800)

Submission ID: 1435668910

File name: Effectiveness_of_Mirror_Therapy_Against_Upper_Limb_Muscle.pdf (307.26K)

Word count: 2375

Character count: 13211

2 Effectiveness of Mirror Therapy Against Upper Limb Muscle Strength in Ischemic Stroke Patients With Hemiparesis: systematic review

Dedi Irawandi¹, I Ketut Sudiana², Abu Bakar³

¹Master Student Faculty of Nursing Universitas Airlangga

²Faculty of Nursing Universitas Airlangga

Keywords: muscle strength, mirror therapy, ischemic stroke, hemiparesis

Abstract: **Background:** Stroke is clinical symptoms which disturbances in blood circulation to the brain caused either local or global malfunctioning that occurs suddenly and rapidly progressive that usually caused hemiparesis in stroke patients. Late and inappropriate exercises management may cause permanent disability. The range of motion exercises and early mobilization in stroke patients may reduce the risk of disability. The one of rehabilitation and intervention is muscle strength exercise by stimulating the nerves and improve the functional status of the motor/muscle strength by using mirror therapy. **Method:** These research based on the literature review (systematic review) of international journals, which is use quasi-experiment, one group pre-post test design. These research using purposive sampling with 10 respondents, while the research instruments using observation sheet those are muscle strength scale and visual imagery scale, the exercise guide sheets and mirror as media. The research analysis using univariate and bivariate analysis. A bivariate analysis using Wilcoxon test. **Results:** The results of these studies indicate that there is increasing in average muscle strength after mirror therapy exercises five times a day for 7 days evidenced by prior intervention the muscles strength mean of upper extremities is 2:12 (0.45). After the intervention, the muscle strength mean of upper extremities became 3.83 (0.56). Based on the results of bivariate analysis obtained the calculated value (4369) and significance levels (p) <0.05. **Conclusion:** The results of the journal's review can be concluded that there is significant differences are muscle strength before and after mirror therapy exercise in ischemic stroke patients with hemiparesis.

1 INTRODUCTION

Stroke is clinical symptoms by interruption of blood circulation to the brain, causing local or global malfunctioning that occurs suddenly, and rapidly progressive (Kasab *et al.*, 2017). According to the data of WHO (2010) stated that every year there were 15 million people worldwide suffered by stroke, which is 6 million people suffered deaths and 6 million people suffered permanent disability. The death rates will continue increased from 6 million in 2010 to 8 million in 2030.

According to (Association, 2010) stroke accounts for 1 in 18 deaths in the United States. In 2009 the prevalence of stroke was 6.4 million. Approximately 795,000 people experience a new stroke, 610,000 of them experiencing first attacks and 185,000 recurrent attacks and the cost of the treatment in

2009 is about 68.9 billion US dollar for health and rehabilitation of stroke (Badan Penelitian dan Pengembangan Kesehatan, 2013). Generally stroke divided into two types: ischemic stroke and hemorrhagic stroke. The incidence of ischemic stroke approximately 85% of all stroke cases (NSA, 2009; Lees, 2007). In Indonesia Government Hospital, stroke is the leading cause of death, the third cause of death and 5th in cause of disability in hospital (pdpersi, 2010). Based on the Basic Health Research (Riskesdas) in 2013, the prevalence of stroke in Indonesia was 7 of 1,000 populations, and who have been diagnosed by health workers was 12.1 of 1,000 populations. In addition, it had been estimated that stroke is cause of death in hospital 15%, with impairment reached 65% (Badan Penelitian dan Pengembangan Kesehatan, 2013).

In stroke patients, 70%-80% experienced hemiparesis (muscle weakness on the one side of

the body) by 20% could improve the motor function while about 50% had residual symptoms such as motor function disorders/muscle weakness in the extremities. If they do not get a good therapy choices in post stroke intervention and rehabilitation (Sengkey, 2014). When hemiparesis patients did not get optimal management about 30% - 60% they will experienced an extremities full function loss within 6 months of post-stroke(Warlow, 2007).

Interventions for healing that could be performed in addition to medication or drugs is physiotherapy/ exercises such as; weightlifting, balance and resistance training, hydrotherapy, and Range Of Motion (ROM) exercise. Among those, ROM are often performed in the rehabilitation process of stroke patients either active or passive and can be performed in hospital(Millis, Lewelling and Hamilton, 2004).

In addition to rehabilitation therapy ROM, either unilateral or bilateral, the mirror therapy is alternative that can be applied and combined in stroke patients to improve the functional status of sensory motor. Mirror therapy is non-invasive intervention, directly related to the motor system by train/stimulate the sensory ipsilateral or contralateral sensory motor cortex lesions. This therapy relies on the interaction of visual-motor perception to improve the movement of the muscle weakness on one side of the body or hemiparesis(Lin *et al.*, 2012).

Mirror therapy exercise is a rehabilitation or exercise that train the imagery or patient's motor imagination. The mirror will provide visual stimulation to the brain (cerebral motor nerves i.e. ipsilateral or contralateral for hemiparesis movement) and the hemiparesis will observed and imitated like the one in the mirror(Kang *et al.*, 2012).Several studies had conducted by scanning the brain and found that during mirror therapy, the active area of this trial is the prefrontal cortex area pramotor cortex, parietal cortex and cerebellum which is the area of motor movements. Therefore repetitive stimulation increased muscle strength and prevent more damage of the neuromuscular and prevent it spread to other areas (Kang *et al.*, 2012)

Those can be explained in research of (Koyama *et al.*, 2014)that there is cortex area of human brain which called F5 with respect to its role in motor movements and visuomotor that send signals when observing, imitating or copying the certain action of what is observed so that the person imagination activated the movement area same as the actual movement.

2 METHODS

The method in this study using literature review-journalssistematic review. These study determined whether there were differences in muscle strength before and after mirror therapy in patients with ischemic stroke. The result of one journal research study, there were 24 patients with criteria diagnosed with ischemic stroke who had passed the critical phase and experience hemiparesis or weakness of one side of the body. The patients got muscle strength measurements, aged adults (18-65 years), compos menthis consciousness (GCS = E4V5M6), got the first attack, muscle strength range is 1-3, were not impaired in hearing and sight (VIS scale: 4), fluids and electrolytes within the normal range. After the desired patients criteria was obtained, patients will be given a range of motion exercises to train the muscle strength five times a day for 7 days in the part of healthy body, then patient was advised to look in the mirror and imagine as if the sick body part moves like healthy body.

The independent variable in this study is muscle strength exercises whereby mirror and the dependent variable is muscle strength of upper-lower extremity which had hemiparesis, while confounding variables were age, sex and time of treatment in hospital (mission time). From journal review, one of the sampling method is using non-probability sampling that is purposive sampling-sample selection technique which is based on the specified purpose of the researcher (Dharma K, 2011).

3 RESEARCH RESULT

The result of journal review had done is as follows: based on journals reviewed, the characteristics of ischemic stroke respondents with hemiparesis is n=10, age of the respondents that the most experienced ischemic stroke is in 56-65 years old with 45.8%. Based on gender can be seen more women than men with a percentage of 54.2%. Duration of respondents get first aid in hospital should be less than 6 hours. From journals reviewed, the average strength of upper muscles after mirror therapy exercise is 2:12 (0:45), while the average of lower muscle strength after mirror therapy exercises was 4.00 (0.66).

4 DISCUSSION

Characteristics of Respondents

Based on the journals reviewed can be concluded that stroke occurred most in 56-65 years old (45.8%). In older people the risk of stroke is increased (Sengkey, 2014). Results of Sacco's research (1997) stated that every 10 years after age 55, the risk of stroke increased is twice. Dugdale (2010) revealed that in elderly the main artery out of blood vessels is more harder, thicker and less elastic as a result of changes in connective tissue in blood vessels which can increase blood pressure. Those condition was said as atherosclerosis, which is one risk factor for ischemic stroke. Characteristics of respondents by sex showed that women more suffer from stroke than men (54.2%). The incidence of stroke were different between men and women, which is women more than men in suffering a stroke (Konin and Jessee, 2012). However, based on these studies there were no significant differences between men and women in terms of: the type of stroke, severity and case fatality rate. Furthermore, also found there was similarities numbers in mortality in male and female leading by stroke (Noorizadeh *et al.*, 2008).

Study of (Michielsen *et al.*, 2011) suggest that the risk factors of stroke in older women associated with body fat distribution in which the condition caused after women in menopause. The duration between after attacked and admitted to the hospital and then hospitalized (admission time) also affect the risk of stroke and stroke recovery. Those results showed that all respondents obtained aid treatment at the hospital less than 6 hours. The sooner get help precisely, the risk of cerebral infarction is smaller. Thus, neurological deficit/neurologic damage is less.

The recovery of stroke patients with minimum infarction will faster than the more severe cerebral infarction. The results of stroke treatment will be maximum for cerebral reperfusion if less than 6 hours of admission time (Altschuler *et al.*, 1999). The available time when a person got attacked is 3-6 hours and should get help immediately in hospital called the golden period. If more than 6 hours the patient will experience severe disability, because the severity of disability caused by stroke is determined by the appropriate first treatment and the type of stroke (Mohammad Fathurrohman, 2011).

Duration between first attack and hospitalization (admission time) also affect the risk of stroke and stroke recovery. In the results above, showed that all respondents obtain treatment aid at the hospital less than 6 hours. The sooner get help precisely, the risk of cerebral infarction getting smaller thus neurological deficit/neurologic damage is less (Mohan *et al.*, 2013).

5 CONCLUSION

These systematic review aimed to determine the effectiveness of mirror therapy to muscular strength in ischemic stroke patients with hemiparesis. These interventions can be recommended by room nurses for the management of mobilization and exercises to prevent permanent disability in stroke patients with hemiparesis. These mirror therapy may apply to families who have family strokes and try the exercises at home for the recovery process for the purpose to increase motor functional status of post stroke (Mohammad Fathurrohman, 2011).

6 SUGGESTION

Based on literature review had been done, it can be concluded that mirror therapy intervention can be used as alternative or combination therapies method for stroke patients for the purpose to reduce permanent disability in ischemic stroke with hemiparesis either hospitalized or homecare.

REFERENCES

- Association, A. H. (2010) *Heart disease & stroke statistics – 2010 Update*. Texas: Dallar.
- Altschuler, E. L. et al. (1999) 'Rehabilitation of hemiparesis after stroke with a mirror', *Lancet*. doi: 10.1016/S0140-6736(99)00920-4.
- Badan Penelitian dan Pengembangan Kesehatan (2013) *Riset Kesehatan Dasar (RISKESDAS) 2013*. Laporan Nasional 2013. Available at: http://www.depkes.go.id/resources/download/general/Hasil_Riskesdas_2013.pdf (Accessed: 1 November 2017).
- Kang, Y. J. et al. (2012) 'Upper extremity rehabilitation of stroke: Facilitation of corticospinal excitability using virtual mirror paradigm', *Journal of NeuroEngineering and Rehabilitation*. *Journal of NeuroEngineering and Rehabilitation*, 9(1), p. 1. doi: 10.1186/1743-0003-9-71.
- Kasab, S. Al et al. (2017) 'Impact of the New American Heart Association/American Stroke Association Definition of Stroke on the Results of the Stenting and Aggressive Medical Management for Preventing

- Recurrent Stroke in Intracranial Stenosis Trial', Journal of Stroke and Cerebrovascular Diseases. Elsevier Inc., 26(1), pp. 108–115. doi: 10.1016/j.jstrokecerebrovasdis.2016.08.038.
- Konin, J. G. and Jessee, B. (2012) Range of motion and flexibility. Fourth Edi, Physical Rehabilitation of the Injured Athlete. Fourth Edi. Elsevier Inc. doi: 10.1016/B978-1-4377-2411-0.00006-X.
- Koyama, T. et al. (2014) 'Relationship between diffusion tensor fractional anisotropy and long-term motor outcome in patients with hemiparesis after middle cerebral artery infarction', Journal of Stroke and Cerebrovascular Diseases. Elsevier Ltd, 23(9), pp. 2397–2404. doi: 10.1016/j.jstrokecerebrovasdis.2014.05.017.
- Lin, K. et al. (2012) 'Effect of mirror therapy combined with somatosensory stimulation on motor recovery and daily function in stroke patients: A pilot study', Journal of the Formosan Medical Association. Elsevier Taiwan LLC, pp. 1–7. doi: 10.1016/j.jfma.2012.08.008.
- Michielsen, M. E. et al. (2011) 'Neurorehabilitation and Neural Repair'. doi: 10.1177/1545968310385127.
- Millis, D. L., Lewelling, A. and Hamilton, S. (2004) Range-of-Motion and Stretching Exercises. Second Edi, Canine Rehabilitation and Physical Therapy. Second Edi. Elsevier Inc. doi: 10.1016/B978-0-7216-9555-6.50017-6.
- Mohammad Fathurrohman (2011) 'Pengaruh latihan motor imagery terhadap kekuatan otot ekstremitas pada pasien stroke'.
- Mohan, U. et al. (2013) 'Effectiveness of mirror therapy lower extremity motor recovery, balance and mobility in patients with acute stroke: A randomized sham - controlled pilot trial', 16(4). doi: 10.4103/0972-2327.120496.
- Noorizadeh, S. et al. (2008) 'Reliability of isokinetic normalized peak torque assessments for knee muscles in post-stroke hemiparesis', 27, pp. 715–718. doi: 10.1016/j.gaitpost.2007.07.013.
- Sengkey, L. S. (2014) 'Mirror therapy in stroke rehabilitation', Jurnal Biomedik (JBM), 6(2), pp. 84–90.
- Warlow, C. et al (2007) Stroke : Practical management.x Blackwell. 5th ed. USA.: Publishing, Inc.,350 Main Street, Malden, Massachusetts.

Effectiveness of Mirror Therapy Against Upper Limb Muscle

ORIGINALITY REPORT

10%

SIMILARITY INDEX

9%

INTERNET SOURCES

4%

PUBLICATIONS

0%

STUDENT PAPERS

PRIMARY SOURCES

1	repository.unair.ac.id Internet Source	2%
2	mafiadoc.com Internet Source	2%
3	jurnal.umt.ac.id Internet Source	2%
4	"1st Annual Conference of Midwifery", Walter de Gruyter GmbH, 2020 Publication	1%
5	www.sohoglobalhealth.com Internet Source	1%
6	sinta3.ristekdikti.go.id Internet Source	1%
7	worldwidescience.org Internet Source	<1%
8	www.frontiersin.org Internet Source	<1%
9	Lugassy, Mara.. "What Is the Role of Palliative	

Care in Stroke?", Evidence-Based Practice in Palliative Medicine, 2013.

Publication

<1%

Exclude quotes On

Exclude matches < 10 words

Exclude bibliography On