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Effect Hypnotherapy for Increasing Muscle Strength in Stroke Patient with Hemiparesis

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ABSTRACT

Sensory stimulus exercise is one of activity of complementary nursing interventions to overcome weakness (hemiparesis). Hypnotherapy is a potential therapy utilizes art of persuasive communication as the sensory input to provoke the somatosensory center in planning and programming movement. This study aimed to identify the effect of hypnotherapy to increase muscle strength and range of motion the joints extremity. Quasi-experimental designs with purposive sampling 44 samples. Control group were given range of motion (ROM) exercise and intervention group were given ROM exercise and hypnotherapy. There was significant effect in both experiment and control group to increase muscle strength. Further analysis also getting significant differences between control and experiment group (p value $< 0,05$). Require for further research with better homogeneity sample and more controlled situation.

INTRODUCTION

Hemiparesis is a motor disorder post stroke attack causes weakness in upper and lower extremity. Stroke attack causes damage in upper neuron and motor disorder was contralateral with damage side of the brain (Pandian & Arya, 2013; Smeltzer & Bare, 2010; Ginsberg, 2007; Silbernagl, 2007). The prevalence of stroke by Riskesdas 2013 in age group 65-74 years (ratio 33.2 in a thousand) and older than 75 years, ratio around 43.1 in a thousand. Prevalence in men more than woman ones, were 7.1 in a thousand (men) and 6.8 in a thousand (woman). Center for Disease Control (CDC) in 2013 describe that the death rate from cerebrovascular disease are 128.978 or ratio 40.8 in a hundred thousand deaths. This result is fifth highest death rank in the world from cerebrovascular disease. The study showed that 40% of stroke patients had mild disabilities, 50% of stroke patients needed rehabilitation programs and only 10% of stroke patients could return to work without weakness (Purwanti, 2008). Another study found that 30% of stroke patients needed assistants at work, 26% of stroke patients needed full support in daily activities, and 26% of stroke patients in institutional care such as home care (Kelly-Hayes et al., 2003; Roger et al., 2012).

Nursing problems of hemiparesis according to NANDA Nursing Diagnosis and Classification 2015 is the physical mobilization disorder (00085), is the limitation of self-contained physical movement of the body not only upper or lower extremity but also both of them, this problem is associated with decreased strength, control, and neuromuscular disorders. The result indicator of the Nursing Outcome Classification (NOC) is to demonstrate mobility characterized by joint movement (020S03) and

muscle movement (020S04). Nursing Intervention Classification (NIC) for physical mobilization disorders is exercise therapy: mobility of joints (0224) and muscle control exercises (0226). There has been no publication of hypnotherapy therapy as a nursing intervention to diagnose impaired physical mobilization. But with the development of complementary research, the provision of sensory stimulation can be done for post-stroke motor repair, such as acupressure that has become a nursing intervention according to the NIC. This study is expected to provide space for the application of hypnotherapy as nursing intervention.

Hypnotherapy is a persuasive art of communication that aimed to giving positive suggestions to the center of human motivation which is called the subconscious mind (Nurinda, 2008; Khilstrom, 2012). Positive suggestions given as sensory inputs or sensory signals to the somatosensory which is a center of planning and movement programming. The movement planning will be executed to initiation of movement. The suggestion about movement will be a memory input of movement from the hippocampus area (where temporary memory is stored), when the hypnotic condition, due to the off-line hippocampus the memory will by pass to the cerebral cortex area (the long-term storage space) quickly to form a movement pattern then will be executed into movement action. Hypnotherapy can be used to assist patients in overcoming barriers within themselves. Human's critical factors is a human filter about information and causes humans to decide something. Hypnosis opens a human critical factor in order to receive positive suggestive ie save motor programming as motor learning, to improve self-motivation and self efficacy in post-stroke motor recovery programs.

Combination hypnotherapy and progressive muscle relaxation causes a relaxed condition which lead activation of the parasympathetic nervous system which can lead to feelings of rest, and improvement of the body's system (James, 2005). Parasympathetic nerve responses contribute about lower heart rate, lower blood pressure, and increase blood flow, so that good effect to reperfusion penumbra in the brain in the early phases post-attack.

METHOD

The research method describes: the method of implementation used in the activities of devotion. The methods are described clearly and in detail [Times New Roman font, 11, Normal]

RESULTS AND DISCUSSIONS

Univariate Analysis

Characteristics of 44 respondents, consist of mean age 54.95 years, most of all are male (56.8%), almost of had non hemorrhagic stroke (90.9%), more than half suffered the first stroke (54.55%) and almost all hospitalized after 6 hours since getting a stroke(86.36%).

Bivariate Analysis

Figure.1st shows muscle strength change in the upper extremity consisting of shoulders, elbows, wrists, metacarpals and phalanges. Both of group found highest muscle strength was metacarpal (after therapy) around 3.05 ± 0.21 , whereas the low mean muscle strength were on the wrist, metacarpal and phalange before therapy (intervention group) were equal score around 1.27 ± 0.55 . The greatest increase in muscle strength was metacarpal (intervention group) at 1.78 with 95% CI (1.5; 2.00) and the lowest increase score was in wrist, metacarpal and phalange around 0.23 with 95% CI (0.04; 0.42) each segment (control group). Further analysis showed that there were significant differences muscle strength in all components (five componens) both the intervention and control group ($p < 0.05$; $\alpha 0.05$). However, after deviation score between pre-post both pretest and posttest both of group (intervention and control group), also showed significant differences muscle strength in five components ($p < 0.05$; $\alpha 0.05$).

Discussion

Hypnotherapy is a cognitive therapy and art in communication. Some of the elements contained in hypnotherapy are broadly divided into two component, i.e. the cognitive component and the motivational component. The cognitive component consists of the increased technical ability of the muscles, due to suggestions that had been given like as motor imagery, subconscious conditions made receive information more intensively, work to stimulate existing memory of the motor or formed new memory and behavior as mind-body communication. Motivation components can make relaxation effects, increased motivation, hypnosis state pass critical factors in human, so that all information will save without filter, using goal-oriented response and management of level desire. Illustration in the brain when hypnosis conditions are consist of motor centers, imagery and rest (Müller, Bacht, Schramm, & Seitz, 2012).

The suggestion that given during hypnosis like as motor imagery. Motor imagery is defined as a cognitive or mental process in exercising motor activity without any real body movement (Allami, Paulignan, & Brovelli, 2008; Lucas et al., 2011). Motor imagery and motor execution show the same biomechanical stress activity, neuromuscular and cognitive mechanisms. In the recording of the brain image also shows the motor imagery has the same electroencephalographic (EEG) pattern as the execution motor. (Allami et al., 2008). The existence of the equation reaction between motor imagery and motor execution to explain the existence of working memory. Improvement motor performance after motor imagery practice as an exercise method to construct motor activity internally, intensive repetition with the aim of encouraging learning or enhancement of motor skills (Lucas et al., 2011).

Both groups of controls and experiments altogether showed a significant association with increased muscle strength The results of this analysis indicate that hypnotherapy has a positive effect in increasing muscle strength. Study of Allami et al., (2008) describe that combination of mental exercise and physical exercise on movement time in hemiparesis patients and the results concluded that the ability at the end of the exercise is better in mental exercises combined with physical exercise compared with just physical one.

The effect of hypnotherapy on motivation can be seen during 10 times intervention, the researcher finds that motivation in the intervention group increases, it seen in respondents and families who reported that if there is no schedule of therapy from researcher, the respondents do repetition ROM independently guided by handbook. Motivation in control group not like as intervention group one.

Figure Muscle Strength before and after both of intervention and control of stroke patients

A motor control requires repetition or amount in motor skills learning, through exercises that are performed not just once time, but many times. This repetition creates motor memory, formation of lesions, synapses genic and molecular network activity between neurons to other neuron (Dobkin, Bruce H., 2003). enhancement motor recovery related to the individual's willingness to practice as often as possible. Hypnotherapy create positive suggestions that are directly be realized or saved into memory storage without passing through screening critical factors that filter information to follow or not to follow. Provision of suggestions about motivation of patients achieve goal-oriented such as convalescence in order to get back to work, not be a family burden, walking as usual, and do daily activities as usual.

Variable	Group	Measurement	n	Mean (SD)	MD (95% CI)	p value
shoulder	Interv	Before	22	1,32 ±0,57	1,50 (1,17; 1,83)	0,000*
		After	22	2,82±0 ,39		
	Control	Before	22	1,41±0 ,50	0,49 (0,83; 1,72)	0,005*
		After	22	1,90±0 ,87		
elbow	Interv	Before	22	1,27±0 ,55	1,41 (1,03; 1,79)	0,000*
		After	22	2,68±0 ,65		
	Control	Before	22	1,41±0 ,50	0,36 (0,11; 0,62)	0,008*
		After	22	1,77±0 ,75		
wrist	Interv	Before	22	1,27±0 ,55	1,5 (1,14; 1,86)	0,000*
		After	22	2,77±0 ,61		
	Control	Before	22	1,41±0 ,50	0,23 (0,04; 0,41)	0,021*
		After	22	1,64±0 ,58		
Meta- carpal	Interv	Before	22	1,27±0 ,55	1,78 (1,5; 2,00)	0,000*
		After	22	3,05±0 ,21		
	Control	Before	22	1,41±0 ,50	0,23 (0,04; 0,41)	0,021*
		After	22	1,64±0 ,58		

				,58			
Phala-nge	Interv	Before	22	1,27±0,55	1,73	0,000*	
		After	22	3±0,31	(1,45; 2,00)		
Control		Before	22	1,41±0,50	0,23	0,021*	
		After	22	10,61±0,58	(0,04; 0,41)		

The other effect of hypnotherapy on motor repair is a relaxation effect. The induction of hypnosis is an application of nursing intervention specifically ie progressive muscle relaxation. Respondents in the intervention group after hypnotherapy (2 to 3 times hypnotherapy) suggested that 15 out of 22 people said the quality of sleep was better, began to accept limitation their condition and the body felt healthy.

Hypnotherapy induced decrease level of consciousness brain system make communication process (offline) between part of brain neuron system lead interruption of adrenal gland secretions and pituitary glands which provides an opportunity for the body to rebuilt the immune system (Rossi, 2002, 2004, 2007). In addition, the amygdala also rapidly and automatically interrupted stress hormones such as epinephrine, corticotrophin and glucocorticoids. Relaxation techniques strongly provide an opportunity for the body to recover itself according to its own system regulation. Relaxation techniques will activate the parasympathetic nervous system (tropic) which can cause desire to rest and improvement of the body's system (James, 2005). The parasympathetic response were lowers the heart rate, lowers blood pressure, and increases blood flow and during inducing patient to breathe deeply and maximally, integrate to transmit oxygen to the blood cell also maximum. This explanation is assumed to support post-stroke penumbra in the later phase, which is useful for edema repair and post-stroke cell repair (Cramer & Nudo, 2010).

The Result of study describe the smallest improvements in muscle strength after hypnotherapy was occurring at the elbow. The pattern of improvement is the improvement from distal to proximal or in other words the greatest improvement of the phalange to the shoulder. The results of this study linear with studies of Kang, Idica, Amitoj, & Cauraugh, (2014) that found movement of shoulders, wrists and phalanges was higher than the movement in the elbow joint. This suggests that muscle activation patterns are positively related between proximal and distal. Improvement and movement in the proximal stimulus also give stimulation to muscle activation in the distal part, also describe by Wook, Katlin, & Love, (2014), that the activity of elbow muscle induction so it will also activate at the level of the hand such as extensor finger muscle (23% at 30% of elbow activity with p value = -0.003). Elbow muscle activation induces an intrinsic change of thumb flexor activation with an increase of 44.6% at 30% elbow extensor activation with p value = 0.005. Electromyogram (EMG) results showed significantly the coherence of among muscular motor activity better in the distal, averaging 47% and progressing elbow flexion around 30% . This result becomes an evidence for the involuntary movement, the specific interaction of the muscles between proximal and distal. Other studies Simkins, Burleigh, & Jacob, (2013), also found that the rate at rotation of the shoulder affected the rhythmic movement of the elbow, the higher the shoulder speed caused the higher the rhythmic movement of the elbow movement. It is concluded that proximal motor activity leads to better results for the distal portion, so that at the distal gain twice, not only get locally stimulated effects in distal part, also get the effects of proximal motor stimulated activity.

Nursing Perspective in Hypnotherapy Implementation to Increase Muscle Strength

One of the problems of nursing in cases of hemiparesis according to NANDA Nursing Diagnosis and Classification 2015 is the disruption of physical mobilization (00085), ie the limitation of self-contained physical movement of the body or one or more extremity, this problem is associated with decreased strength, control, and neuromuscular disorders. The result criteria of the Nursing Outcome Classification (NOC) to demonstrate mobility characterized by joint movement (020S03) and muscle movement (020S04). While the criteria of intervention outcomes to be achieved according to Black et al, (2014) are patients can achieve maximal mobilization under conditions of limitations as stroke is characterized by more normal movement of influential extremity, increased muscle strength, and effective use of adaptive aids. Nursing Intervention Classification (NIC) in physical mobilization disorders is exercise therapy: mobility of joints (0224) and muscle control exercises (0226). Nursing interventions for nursing diagnoses of impaired physical mobilization have not been found the implementation of complementary therapies. But with the development of complementary research, the provision of sensory stimulation can be done for post-stroke motor repair, such as acupuncture that has become a nursing intervention according to the NIC. With these results being the beginning that hypnotherapy can be one of the independent nursing interventions in motor repair, for future may become an intervention in the NIC.

Weakness

No publication of research like this before so there are still many weaknesses, among others, were

1. The researcher can't control the number of exercises done by patient independently so that this affects was the final result of each patient.

Retrieval on inclusion criteria on muscle strength of only 1-2 leads increasing muscle strength can't achieving more functional improvement such as grasping movements. Recommendation to study with this intervention to patients with higher muscle strength so that the target a functional movement like grasping object.

CONCLUSION AND SUGGESTION

Hypnotherapy has an effect on increased muscle strength but it takes a follow-up with similar study to confirm the effect of this hypnotherapy.

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REFERENCES

- Aligood, Martha R & Tomey, Marriner A., "*Nursing Theory and Their Work 7th ed*", USA: Mosby Elsevier. 2010.
- Allami, N., Paulignan, Y., & Brovelli, A., "Visuo-motor learning with combination of different rates of motor imagery and physical practice", *Exp Brain Res*, 184, pp.105–113. 2008.
- Cramer, S. C. & Nudo, R. J, Eds., "*Repair, brain stroke, after title*", United State of America: Cambridge university Press. 2010.
- Dobkin, Bruce H., "*The Clinical science of neurologic rehabilitation*". New York: Oxford University Press. 2003.
- Forrester, L. Wheton, L. & Lufti, A., "locomotor recovery lower limb", *Journal Of Rehabilitation Research Dan Development*, vol. 45(2), pp. 205–220. 2008.
- Han, C. Wang, Q. & Meng, P., "Effects of intensity of arm training on hemiplegic upper extremity motor recovery in stroke patients : A randomized controlled trial". *Clinical Rehabilitation*, vol. 27(1), pp. 75–81. 2012.
- James, H. S., "Hypnosis in Contemporary Medicine", *Mayo Clinic Prosiding*, vol. 80(4), pp. 511–524.

2005.

- Kang, N. Idica, J. Amitoj, B. & Cauraugh, J. H., "Motor recovery patterns in arm muscles : coupled bilateral training and neuromuscular stimulation". *Jornal Neuroengineering and Rehabilitation*, vol. 11(57), pp. 1–10. 2014.
- Kim, jin S. Oh, D.-W. Kim, S.-Y. & Choi, J.-D., "Visual and kinesthetic locomotor imagery training integrated with auditory step rhythm for walking performance of patients with chronic stroke". *Clinical Rehabilitation*, vol. 25, pp.134–145. 2011.
- Lucas, M. F. Teixeira, S. Paes, F. Velasques, B. Ribeiro, P. Nardi, A. E. & Machado, S., "Motor Imagery and Stroke Neurorehabilitation: An Overview of Basic Concepts and Therapeutic Effects Amanda Lopes Abbas , Institute of Psychiatry , Brain Mapping and Sensory Motor Integration , Federal University of Rio de Janeiro (IPUB / UFRJ) Brazil", *American Jornal of Neuroscience*, vol. 2(2), pp. 59–64. 2011.
- Müller, K. Bacht, K. Schramm, S. & Seitz, R. J., "The facilitating effect of clinical hypnosis on motor imagery : An fMRI study", *Behavioural Brain Research*, vol. 231(1), pp. 164–169. 2012.
- Nurinda, Yan., "Hypnosis fo dummies", IBH Free book, 2008
- Nurinda, Yan., "Stage Revealed", IBH free book, 2008
- Pandian, S. & Arya, K. N., "Motor impairment of the ipsilesional body side in poststroke subjects", *Journal of Bodywork & Movement Therapies*, vol. 17(4), pp. 495–503. 2013.
- Polit, D. F. & Hungler, B. P., "Nursing research : principles and methods (6th Ed.)", Philadelphia: Lipincott Williams & Wilkins. 2004.
- Purwanti, Okti S dan Maliya, A. "Post-Stroke Rehabilitation". *News Journal Nursing Science*. Vol. 1(1), pp. 43-46. Maret 2008.
- Rossi, E. L. & Rossi, K. L., " *The new neuroscience of pschotherapy, therapeutic hypnosis and rehabilitation: A creatove dialogue with aour genes* (2nd ed.)" , Los Ocos: Ernest Lawrence. 2008.
- Simkins, M. Burleigh, A. & Jacob, J., "Rhythmic affects on stroke - induced joint synergies across a range of speeds", *Exp Brain Res*. vol. 229, pp. 517–524. 2013.
- Smeltzer, "Keperawatan Medikal Bedah: Brunner dan Suddart", Jakarta: ECG. 2010.
- Wei, W. Bai, L. Wang, J. Dai, R. Tong, R. K. Zhang, Y. & Tian, J., "A Longitudinal Study of Hand Motor Recovery after Sub- Acute Stroke : A Study Combined fMRI with Diffusion Tensor Imaging. *PLoS Medicine*, 8(5). (2013)
- Wook, S. Katlin, L. & Love, M. L. H., "Activation and intermuscular coherence of distal arm muscles during proximal muscle contraction", *Exp Brain Res*, vol. 232, pp.739–752. 2014.