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The Combination Effect of Motor Relearning Program and Positive Affirmation on Functional Abilities and Quality of Life in Post Stroke Patients at Ngudi Waluyo Wlingi Hospital

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ABSTRACT

Background: Stroke is a disease that causes chronic disability. It is hoped that the combination of Motor Relearning Program (MRP) and Positive Affirmation (PA) will be able to improve the functional abilities and quality of life (QoL) of post-stroke patients considering that there is no intervention that combines these two methods.

Purpose: The purpose of this study was to analyze the effect of the combination of MRP and PA on the functional abilities and QoL of post-stroke patients at Ngudi Waluyo Wlingi Hospital.

Methods: The research design used is quantitative research using the *true experimental pre and post with controlled design*. The sampling technique used was *Simple Random Sampling* with a sample of 7 people given a combination of MRP and PA (Group A), 7 people given MRP treatment (Group B), 6 people given PA treatment (Group C), and 7 people in the control group given conventional physiotherapy treatment (CPT) (Group D). The research was carried out for 4 weeks with 3 sessions. Functional ability was measured using Barthel Index and QoL was measured using Stroke Impact Scale. Paired sample t, ANOVA, Tukey post hoc, and Games-Howell post hoc tests was used to analyzed the data.

Results: With the exception of the PA group, which had a p-value of 0.000 > 0.05 for functional ability, the results of the paired t-test showed that the p-value was 0.000 for both functional ability and QoL for all treatment groups. This suggests that functional abilities were unaffected by PA. ANOVA test results revealed a significance value of 0.000, below the 0.05 alpha threshold. This indicates that the pre-post test results for each treatment group differ significantly from those of the control group. Group C (PA) and Group A (a mix of MRP and PA) had the biggest mean difference, according to the Tukey test, with a value of 38.80. Additionally, the Games-Howell test's QoL scores showed.

Conclusion: PA treatment has no effect on improving the patient's functional ability, but has an effect on patient's QoL, so it is recommended to combine it with MRP treatment. The combination treatment of MRP and PA is recommended to be given simultaneously to improve the functional ability and QoL of post-stroke patients for maximum results.

Keywords: motor relearning program, positive affirmation, stroke

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BACKGROUND

Stroke is a disease of the brain in the form of local and/or global disruption of nerve function, with a sudden, progressive and rapid appearance. There are two types of stroke, namely bleeding stroke or hemorrhagic stroke and non-bleeding stroke called ischemic stroke. The incidence of stroke due to obstruction (ischemic) is between 70-80% and stroke due to bleeding (hemorrhagic) is 15-30%. Ischemic strokes are caused by, among other things, brain thrombosis (thickening of the artery walls) and embolism, while hemorrhagic strokes can be caused by aneurysms and angiomas (Othadinar et al., 2019). Stroke was the main cause of disability in 1998 and this number is predicted to continue to increase until 2020, when it is estimated that 7.6 million people will experience a stroke which can result in disability. In Asia, more than 60% of the population of stroke patients occurs, especially since many of the countries are still "developing" economies. Stroke patients in Asia can be proven to have the highest rates, such as in Mongolia with a percentage of 222.6/100,000 person-years, and in Indonesia with a percentage of 193.3/1,000,000 person-years. Riskesdas results in 2018 stated that the prevalence of stroke among those aged ≥ 15 years in each province had increased by 3.9% from the last data taken in 2013 of 7% (Masala et al., 2022).
Those who experience a stroke have difficulty maintaining social life and the ability to carry out daily or functional activities because clinical manifestations of stroke include hemiparesis or weakness on one side of the body, difficulty speaking or understanding words, muscle and joint stiffness, pain, bad mood, loss of appetite, lack of sleep and constipation. These problems are an important goal of rehabilitation, because these problems can reduce the individual's ability to perform Activity Daily Living (ADL) or functional ability and cause disruption in community activities (Pratama et al., 2022). Functional disability caused by stroke, whether directly or indirectly, greatly affects the Quality of Life (QoL) of post-stroke patients (Athiutama & Trulianty, 2021). Thus, patients with stroke are very vulnerable to experiencing problems with their QoL. Stroke patients really need physiotherapy treatment to restore their functional ability to be independent in taking care of themselves and carrying out daily life activities with confidence without being a burden on their families to improve their QoL (Lestari, 2022).

Stroke rehabilitation programs by physiotherapy have been proven to optimize recovery, so that stroke sufferers get functional outcomes and a better quality of life. One rehabilitation program that is often used to restore function due to motor deficits is the Motor Relearning Program (MRP). Combined with Positive Affirmation (PA), they also experienced an improvement in their quality of life. Apart from patients being able to carry out functional activities, they can also carry out social activities with confidence. No research has yet been conducted that combines MRP and PA, so this research is the first research that combine this two methods. Research conducted by Falk et al., 2015 explains that PA are effective in adding intervention in a number of domains, by reducing negative behavior and increasing the recovery process that can threaten the patient's functional abilities. By combining MRP and PA to train stroke patients as a functional activity learning process, and applying the basic premise that the brain's capacity is able to reorganize and adapt by applying the brain's plasticity ability with directed training, stroke patients can certainly recover and improve. In addition, relearning motor control eliminates unnecessary movements and improves postural and movement regulation. With the training of the emocial aspects of the support of the closest person plays an important role in the patient's recovery process. So that it can increase patient intervention in doing exercise comfortably. Where exercise can help train balance, coordination and improve patient health (Chumbler et al., 2015).

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OBJECTIVE

This study aims to determine the impact and differences in the effects of intervention in the combination of MRP and PA treatment (Group A), MRP treatment (Group B), PA treatment (Group C), and CPT as control group (Group D) on functional ability and QoL in post stroke patients.

METHODS

Quantitative research using a true-experimental with a pre- and post-test control group design. The research was carried out in Ngudi Waluyo Wlingi Hospital with total 27 patients were included in this study. The sampling technique in this research is simple random sampling. This sampling is designed to ensure that each participant has an equal probability of being assigned to either the control or experimental group. Using a random number table, selected patients were randomly divided into four groups, Group A (n=7), Group B (n=7), Group C (n=6), and Group D (n=7). With the exception of group C, 1 respondent dropped out due to his health condition. Group A was the experimental group where MRP along with PA was given to all the patients for 4 weeks with 3 sessions per week for 40 minutes/day. Group B was the experimental group where MRP was given to all the patients for 4 weeks with 3 sessions per week for 30 minutes/day. Group C was the experimental group where PA program was given to all the patients for 4 weeks with 3 sessions per week for 10 minutes/day. Group D was the control group where CPT was given to all the patients for 4 weeks with 3 sessions per week for 30 minutes/day.

MRP consists of several exercises, namely upper limb function (reaching, grasping, moving and manipulating objects), sleeping to sitting ambulation, sitting balance, sitting to standing ambulation, standing balance, walking with both feet stably and correctly. PA were given with the first step being breath training with pursed lip breathing technique. Then focus the respondent to suggest that the respondent is healthy, and able to carry out instructions confidently without fear. While in CPT, the actions provided include interventions commonly provided by physiotherapists in hospitals, namely faradic, infrared, and PROM exercises.
Functional ability was analyzed using Barthel Index (BI) and QoL was analyzed using Stroke Impact Scale (SIS). BI measurement based on statements divided into 10 questions. While SIS measurements are based on statements that have been divided into 8 domains, each of which has 4 to 10 questions. Data was analyzed by using SPSS version 26. Paired sample t, ANOVA, Tukey post hoc, and Games-Howell post hoc tests were used to compare the effects of MRP and PA on functional abilities and QoL in post-stroke patients.

RESULTS

Table 1. The Demmographic Characteristics of the Respondent

	Group A		Group B		Group C		Group D	
Data Characteristic	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Age								
30 – 40 years	1	14	2	29	0	0	0	0
41 – 50 years	2	29	4	57	3	50	4	57
51 – 60 years	3	43	0	0	2	33	2	29
>60 years	1	14	1	14	1	17	1	14
Total	7	100	7	100	6	100	7	100
Gender								
Male	4	57	4	57	2	33	3	43
Female	3	43	3	43	4	67	4	57

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Total	7	100	7	100	6	100	7	100
Stroke Classification								
Ischemic	4	57	5	71	2	33	4	57
Hemorrhagic	3	43	2	29	4	67	3	43
Total	7	100	7	100	6	100	7	100
Lesion Side								
Sinistra	4	57	4	57	3	50	3	43
Dextra	3	43	3	43	3	50	4	57
Total	7	100	7	100	6	100	7	100
Duration of Stroke								
≤4 weeks	6	86	7	100	5	83	6	86
>4 weeks	1	14	0	0	1	17	1	14
Total	7	100	7	100	6	100	7	100

It can be seen that the majority of respondents ages are in the range of 41 - 50 years with most being female and classified as ischemic stroke. The lesion area in the majority of respondents was sinistra with duration of ≤4 weeks (as shown in Table 1).

Table 2. Data Analysis between Group A, Group B, Group C, and Group D on Functional Ability

	Group A			**Group B**			**Group C**			**Group D**		
	N	**M ± SD**	***P-value***	**N**	**M ± SD**	***P-value***	**N**	**M ± SD**	***P-value***	**N**	**M ± SD**	***P-value***
Pre	7	22,14 ± 9,51	0,000	7	30 ± 14,72	0,000	6	25 ± 13.42	0.103	7	24,29± 8,38	0,000
Post	7	90,71 ± 4,499	0,000	7	84,29 ± 6,72	0,000	6	53.33 ± 10.80	0.103	7	6929 ± 4,499	0,000

Table 3. Data Analysis between Group A, Group B, Group C, and Group D on QoL

	Group A			**Group B**			**Group C**			**Group D**		
	N	**M ± SD**	***P-value***	**N**	**M ± SD**	***P-value***	**N**	**M ± SD**	***P-value***	**N**	**M ± SD**	***P-value***
Pre	7	30,81 ± 20,23	0,001	7	23,27 ± 16,21	0,000	6	25,22 ± 16,59	0.000	7	30,81 ± 20,23	0,000
Post	7	83,48 ± 9,44	0,001	7	72,33 ± 8,59	0,000	6	59.91 ± 14.91	0.000	7	83,48 ± 9,44	0,000

There were significant differences between pre-treatment and post-treatment in functional ability mean scores of all the parameters (P = 0,000), except in Group C (PA) (P = 0,103) (as shown in Table 2). In QoL, there were also significant differences between pre-treatment and pro-treatment mean scored of all the parameters (P = 0,000) (as shown in table 3). It is known that the functional ability using the Tukey test (Table 4) shows the Group A (combination of MRP and PA) and PA groups as the largest group average difference or Mean Difference with a value of 38.80. Meanwhile, the QoL described by the Games-Howell test (Table 5) shows Group A (combination of MRP and PA) and control groups as the largest group average difference with a value of 52.11.

Table 4. Data Analysis within Group A, Group B, Group C, and Group D on Functional Ability

	Functional Ability		**Sig.**	**Mean ± SD**
Tukey post hoc	MRP+PA	MRP	0,166	7,85 ± 3,64

(ANOVA; *P* = 0,000)	PA	0,000	38,80 ± 3,79
	CPT	0,000	22,85 ± 3,64
MRP (ANOVA; *P* = 0,000)	PA	0,000	30,95 ± 3,79
	MRP+PA	0,166	-7,85 ± 3,64
	CPT	0,002	15 ± 3,64
PA (ANOVA; *P* = 0,000)	MRP	0,000	-30,95 ± 3,79
	MRP+PA	0,000	-38,80 ± 3,79
	CPT	0,002	-15,95 ± 3,79
CPT (ANOVA; *P* = 0,000)	MRP	0,002	-15 ± 3,64
	PA	0,002	15,95 ± 3,79
	MRP+PA	0,000	22,85 ± 3,64

Table 5. Data Analysis within Group A, Group B, Group C, and Group D on QoL

	Quality of Life		**Sig.**	**Mean ± SD**
Games-Howell post hoc	MRP+PA (ANOVA; *P* = 0,000)	MRP	0,000	11,15 ± 1,60
		PA	0,000	23,57 ± 2,35
		CPT	0,000	52,11 ± 2,33
	MRP (ANOVA; *P* = 0,000)	PA	0,000	12,42 ± 2,30
		MRP+PA	0,000	-11,15 ± 1,60
		CPT	0,000	40,96 ± 2,28
	PA (ANOVA; *P* = 0,000)	MRP	0,000	-12,42 ± 2,30
		MRP+PA	0,000	-23,57 ± 2,35
		CPT	0,000	28,54 ± 2,85
	CPT (ANOVA; *P* = 0,000)	MRP	0,000	-40,96 ± 2,28
		PA	0,000	-28,54 ± 2,85
		MRP+PA	0,000	-52,11 ±2,33

DISCUSSION

Stroke patients really need physiotherapy intervention to restore motor function caused by hemiparesis to be independent in taking care of themselves and carrying out daily life activities without being a burden on their families (Lestari, 2022). Stroke is characterized by loss of motor and communication abilities, as well as cognitive impairment. The interesting thing is that brain stimulation, such as stimulation in the form of exercise, can give rise to adaptive plastic potential which speeds up the stroke rehabilitation process, because when the primary motor cortex (M1) and corticospinal cortex are damaged, the ipsilesional premotor area (PMAs) can be used as a replacement. Exercise to regenerate nerve cells is very necessary after a stroke (Rahayu & Ambarwati, 2020).

Before Motor Relearning Program (MRP) existed, functional abilities in post-stroke patients such as moving the arms and hands or affected tissues. This includes the ability to reach, hold, and use the hands for daily activities. Post-stroke assessment of a patient's speaking ability, whether they have difficulty swallowing food or drink, can result in a decrease in the digestive system and energy, but can also result in a patient's decreased concentration or cognitive decline (Cahyati et al., 2018). MRP is a rehabilitation approach that focuses on improving motor function impaired due to stroke. MRP is designed to improve motor control and movement coordination (Hasbiah & Ahmad, 2021). Task-specific based training is the main principle of rehabilitation for stroke sufferers. This approach can take the form of daily basic motor exercises, upper arm movement exercises, lower leg movements, sitting movements, standing, and repetitive walking exercises, where these

exercises can effectively improve post-stroke recovery. A task-specific repetitive training approach can trigger the formation of new, more permanent synapses and is associated with cortical reorganization. This is done by involving exercises focused on restoring or improving motor control and movement coordination. It involves repetitive exercises to rebuild neural circuits and strengthen damaged motor pathways.

The QoL of post-stroke patients before the implementation of MRP refers to how patients experience and assess their life after experiencing a stroke. Stroke can have a significant impact on various aspects of a patient's life, including physical, mental, social and emotional (Ayuningputri & Maulana, 2013). Patients may experience physical limitations and weaknesses that affect their independence. Cognitive disorders such as problems with memory, attention, and problem solving can affect the patient's ability to interact with the environment and live their daily life (Boletimi et al., 2021). Improvements in patient abilities can reduce burden and stress for patients and the family members who care for them. This can also allow patients to be more active in helping and interacting with the family.

Positive Affirmation (PA) is an approach that involves the use of repeated positive statements to help individuals feel more positive and confident. However, it should be noted that the effects of PA may be more psychological than physical (Niawati & Supradewi, 2017). Although PA can have a positive impact on psychological and emotional conditions, however PA may not have a direct or significant impact on the recovery or improvement of functional abilities of post-stroke patients. PA generally focuses on the psychological and emotional aspects of individuals, which can influence their view of themselves and situations. Functional ability is usually more related to physical factors and rehabilitation involving physical exercise, physical therapy, and other medical interventions. Limitations or improvements in the functional abilities of post-stroke patients are more influenced by factors such as changes in nerves, muscles, movement coordination, and tissue regeneration (Sukesih & Siswanti, 2017).

Repeated positive statements in PA can help patients build greater self-confidence, especially in facing physical changes and challenges after stroke. Before applying positive affirmation (PA) to post-stroke patients, it showed that traumatic events could trigger post-traumatic stress disorder in some patients. Patients may experience flashbacks, nightmares, severe anxiety, or other emotional reactions related to the event of their stroke. Stroke can affect cognitive functions, such as memory, attention, and problem solving. This can cause emotional changes, including mood swings and feelings of disturbance in post-stroke patients. The psychological impact of implementing positive affirmation (PA) can help improve post-stroke patients' views of themselves, situations and life as a whole. Thus, PA may be a useful intervention in supporting stroke patients' QoL by changing their view of themselves and the situation. Additionally, PA can provide the motivational boost necessary to actively participate in rehabilitation programs and medical care. Higher motivation can lead to recovery towards a better QoL (Hasanah, 2023).

By combining MRP and PA, it is known that MRP can increase stimulation for functional abilities, while PA can increase the emotional state of post-cancer patients to be more enthusiastic about living life again. Through the combination of PA and MRP, patients can feel supported and empowered in their recovery journey. They may feel they have greater control over their condition. Without MRP, they may have difficulty walking, moving their arms, and carrying out daily activities such as eating and dressing (Rauf et al., 2021). In addition, without psychological support such as PA, stroke patients are at higher risk of experiencing depression and anxiety. They may feel hopeless, anxious about recovery, or low in self-esteem due to the physical changes that occur (Hasanah, 2023). The application of a

combination of MRP and PA requires collaboration between the patient, physiotherapist and family support. Each step must be tailored to the patient's unique condition and needs to maximize positive results in the patient's functional ability and QoL after stroke.

CONCLUSION

PA treatment has no effect on improving the patient's functional ability, but has an effect on patient's QoL, so it is recommended to combine it with MRP treatment. The combination treatment of MRP and PA is recommended to be given simultaneously to improve the functional ability and QoL of post-stroke patients for maximum results.

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