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THE EFFECT OF TASK-ORIENTED GAIT TRAINING PROGRAM ON IMPROVE THE WALK ABILITY IN POST STROKE PATIENTS

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Abstract Stroke is the main cause of disability and death in the world, which can make sufferers experience a decrease in quality of life, such as common problems from stroke are balance disorders, endurance, walking speed, cognitive function and walking ability. This study aims to determine the effect of task-oriented gait. training on changes in balance, endurance, walking speed, cognitive function and the ability to walk in post stroke patients. This research is a quasy experimental research with a pre-test-post-test two group design approach. This study evaluated the balance, endurance, walking speed, cognitive function and walking ability of post-stroke patients. This research was conducted at RSKD South Sulawesi (Stroke Center) Makassar and RSUD Haji Makassar with a total sample of 15 patients aged 40 years and over, diagnosed with post stroke movement function disorders, confirmed medical records that were scheduled to undergo physiotherapy. Samples were taken using purposive sampling method. Balance is measured by the Berg Balance Scale (BBS), endurance is measured by a 6-minute Walk Test (6MWT), walking speed is measured by a 4-meter Timed Walk (Gait Speed Test), and walking ability is measured by Modified Functional Ambulation Categories (mFAC). Measurements were made before the intervention and after the treatment group and the control group. The results of the intervention group study showed that Task-Oriented Gait Training gave significantly better results than the control group.

Keywords task-oriented training, balance, endurance, walking speed, cognitive function, walking ability.

1. PRELIMINARY

Stroke is the third leading cause of death in the world after coronary heart disease and cancer in both developed and developing countries. One in 10 deaths is caused by a stroke. Globally, 15 million people have a stroke each year, one third die and the rest have permanent disabilities. Stroke is the leading cause of disability and death in the world, based on WHO data, stroke is the third leading cause of death and kills 2.7 million people (6.8%) in 2012, while in America stroke is the fifth leading cause of death where 129,000 people per year dies and 1 in every 20 deaths in the United States is due to stroke (Astuti & Dirdjo, 2017) . According to the American Heart Association in 2018, approximately 795,000 people experience a first stroke or recurrent attack each year . About 610,000 of them suffer from the first attack, while 185,000 people have repeated attacks. In ASEAN countries, stroke is also a major health problem that causes death. Based on data from the South East Asian Medical Information Center (SEAMIC), it is known that the largest crude death rate for stroke occurred in Indonesia which was then followed in sequence by Singapore (54.2 / 100.000), Brunei (25 / 100.000), Philippines (20 , 5 / 100,000), Malaysia (15.9 / 100,000), and Thailand (10.9 / 100,000). In Indonesia, ischemic stroke is the most common type of stroke, which is 52.9%, followed by intracerebral hemorrhage, embolism, and subarachnoid hemorrhage, respectively , with the proportion of incidence rates of 38.5%, 7.2%, and 1.4 respectively. % (Dinata, CA, Safrita, YS, & Sastri, 2013) .

Based on the 2018 National Basic Health Research, the prevalence of stroke in Indonesia based on the diagnosis of health workers increased from 7% per million to 10.9% per million. The highest prevalence of stroke based on diagnosis by health professionals was in North Sulawesi (14.4%), followed by DI Yogyakarta (14.6%), East Kalimantan (14.7%) Bangka Belitung (12%), DKI Jakarta (11.5%), West Sumatra (10.7%), Papua (4.1%), NTB (8%), while South Sulawesi (10.5%) per mile.

Stroke is the leading cause of disability worldwide, the second common cause of dementia, and the third leading cause of death (Mir & Albaradie, 2014) . The activity that is most disturbed by stroke is walking, as many as80% lose this ability (Wevers et al., 2009) . Fortunately, the ability to walk rapidly improves in the first 2 weeks after stroke (Jeon et al., 2015) . For most people, however, the recovery of walking ability is sometimes imperfect. A record 8-10 people return

home after the rehabilitation program, walking at an average speed that is insufficient to even cross the road safely, or even walk safely across the road. Public.

Growing evidence suggests that task-oriented training (Jeon et al., 2015) , which is performed at high intensity can increase walking competence in people with stroke to a higher level than other methods of task-oriented training, carried out in a series of workstations. / work area, has recently been shown to be useful in a small proportion of the chronic stroke group (Wevers et al., 2009) . The impact of the program on the wider stroke population and at an early stage is unknown.

Based on secondary data conducted in April 2018, it shows that there are around 20 post-stroke patients with walking problems who are currently outpatient at the Stroke Center Hospital and the Makassar Haji Regional General Hospital.

Based on the description above, the authors are interested in examining the effects and benefits of task-oriented gait training in improving walking ability in post-stroke sufferers.

2. METHODS

Design and Research Time

This research was conducted at the Special Hospital for the Province of South Sulawesi Dadi (Stroke Center) Makassar and the General Hospital of the Haji Makassar Region from May to July 2019. This type of quasy experimental research used a pre-test-post-test two group design approach.

Populations and Samples

The population in this study were post-stroke patients in the first year who had been previously treated at the Special Hospital of South Sulawesi Province Dadi (Stroke Center) Makassar and the General Hospital of the Haji Makassar Region. The sample size in this study used 30 patients with the sampling technique using purposive sampling method.

Data Collection Instruments

Data collection on balance, endurance, speed, cognitive function and walking ability was carried out twice, namely before giving the training program (baseline) and two days after the end of the task-oriented training program.

Data Analysis

Before to the parametric test, data normality and homogeneity tests were performed. To analyze the effect of task-oriented link training on changes in intermediate and dependent variables, the Mann Whitney test was performed. Descriptive statistics are presented in the form of mean ± standard deviation, while categorical data are presented in terms of frequency and percentage. Statistical analysis was performed using SPSS Windows Version 21.0 software.

Sample Characteristics

Table 1 shows that in the intervention group, the sex of post stroke patients was male as many as 7 people (46 , 7 %), and women as many as 8 people (53.3%). Distribution according to age shows that the age group of 41-59 years is 8 people (53 , 3 %), and 60 years and over are 7 people (46.7%). Whereas in the control group, the sex of post stroke patients was male as many as 10 people (66 , 7 %), and women as many as 5 people (33.3%). The distribution according to age shows that the age group of 41-59 years is 11 people (73 , 3 %), and 4 people over 60 years old (26.7%).

Table 1 Demographic characteristics the sample of post stroke sufferers at the Special Hospital of South Sulawesi Province Dadi (Stroke Center) Makassar and the General Hospital of the Haji Makassar Region

Sample Characteristics	Intervention		Control	
	n	%	n	%
Gender				
Man	7	46.7	10	66.7
Women	8	53.3	5	33.3
amount	15	100.0	15	100.0
Age				
41-59 years	8	53.3	10	66.7
	7	46.7	5	33.3

60 years and above				
amount	15	100	15	100

3. DISCUSSION

This study shows that there is a significant effect of task-oriented gait training on balance changes in post-stroke patients. Task-oriented work in specific tasks in an effort to improve the appropriate skills. The difference between task-oriented approaches depends on where the relative emphasis is placed, in this case the task-oriented approach is oriented towards improving balance, endurance, walking speed, cognitive function, gait ability by stimulating trunk muscles.

In theory, truncal control exercise can strengthen the trunk muscles which will provide the background for stabilization of the core muscles of the body so that it can increase the movement of the proximal and distal segments of the extremities (Wee et al., 2015) . Postural stabilization of the body will improve the performance of the core muscles, one of which is the contraction of the intra-abdominal pressure on the abdominal muscles, supported by increased shoulder stabilization during truncal control exercises, which will support the initiation of motor impulse processes to make more stable movements so as to improve balance (Kusnanto et al. al., 2016) .

Kim et al. (2003) reported that task-oriented training on mobile surfaces for stroke patients improved dynamic balance. Leroux et.al (2006) reported that task-oriented training for chronic stroke patients increased the BBS score significantly. These results agree with those of this study and suggest that task-oriented training can improve balance. These results also suggest that task-oriented training affects balance and weight shifts in stroke patients, which should aid in restoring balance. Further research will be needed to determine the factors that influence balance such as vestibular function, proprioception, musculoskeletal system and cognition (BH Kim et al., 2012) .

The results of this study are similar to those of Kim et.al (K. Kim et al., 2017) reporting that task-oriented gait training improves the results of the 6-minute walk test and also has a positive effect on walking endurance in acute and chronic stroke patients. The ability to walk, as measured by the 6-minute walk test was associated with a higher quality of life and is a good predictor of walking capacity in post-stroke patients.

In the muscles there is also an increase in the number and size of the mitochondria so that it can increase the muscle capacity to generate ATP aerobically. In addition, there is an increase in the concentration of myoglobin in the muscles which can increase the speed of oxygen transport and the rate of oxygen diffusion in the mitochondria. The change that occurs is a decrease in the rate of muscle glycogen depletion at sub-maximal work levels.This will be followed by an increase in the ability to oxidize carbohydrates because: Increased oxidative potential in the mitochondria and increased glycogen stores in muscles (Hall, 2016) .

Flansbjer et.al, (2005) suggest that improvements in the 6-minute walk test distance should exceed 13% to be clinically significant. Our findings reveal that both groups improved significantly. While the experimental group increased the distance from 20.13 m to 31.33 m on average with an increase of 55.63%, the control group showed an increase of 2.1%. Significant differences between groups were identified for the 6-minute walk test ($p = 0.000$).This result may be due to adequate training as intensity and frequency, with the use of progressive enhancement in task-oriented gait training programs.

Both groups showed significant improvement in TUG (Time Up & Go Test) and 10m WT (10 minutes Walking Test) after intervention but the experimental group showed greater improvement than the control group. Cho et.al(2004) reported that after task-oriented training, the walking speed of stroke patients increased significantly (from 2.88 m / sec to 3.74 m / sec 21), and Leroux et.al (2006) reported that 10mWT decreased significantly from 25.2 ± 14.4 s to 20.8 ± 10.5 seconds. Yang et al. stated that the walking speed of stroke patients increased significantly from 0.84 ± 12.7 m / s to 0.92 ± 13.5 m / s with task-oriented strength training (Yang et al., 2006) . These results are similar to those of this study and suggest that task-oriented tasks can be an effective intervention for the walking ability of stroke patients.

Cognitive function of patients with stroke patients affect the style of running and they must have the cognitive ability to understand and learn the commands for successful rehabilitation. Disturbance between motor control activity when performing two tasks (eg, cognitive tasks and gait) simultaneously is an important therapeutic environmental factor for independently improving the functioning of patients with neurological disorders. Therefore, a therapist should include cognitive treatment in the rehabilitation therapy plan .

The assessment of walking ability using mFAC is calculated based on a score at the most independent level (supervision or physical assistance required for ambulation) ranging from 0 to 7. In general, task-oriented training has been shown to be effective in improving the walking ability of post-stroke patients. This is due to a presynaptic enhancement mechanisme that inhibits hyperactive stretch reflex in spasmatic muscles, decreased co-contraction of the spastic antagonist antagonist, and cessation of voluntary orders descending to paretic muscle motoneurons.

RESULTS

Different Sample

Table 2 shows that there is a significant effect of the pre-test and post-test balance with a value of p = 0.000 (<0.05) from 42.13 ± 1.598 to 53.00 ± 1.464, there is a significant effect of pre and post test endurance. test with a value of p = 0.000 (<0.05) from 20.13 ± 1.598 to 31.33 ± 1.447, there is a significant effect of walking speed pre test and post test with a value of p = 0.001 (<0.05) from 0.482 ± 0.075 to 1.034 ± 0.203, there is a significant effect of walking speed pre test and post test with a value of p = 0.001 (<0.05) from 25.60 ± 1.595 to 30.00 ± 0.000, there is a significant effect from the ability to walk pre test and post test with a value of p = 0.000 (<0.05) from 5,000 ± 0,000 to 7.00 ± 0,000.

Table 2 The results of the analysis of differences in balance, endurance, walking speed, cognitive function, the ability to walk in post stroke patients pre test and post test in the intervention group at the Special Hospital for the Province of South Sulawesi Dadi (Stroke Center) Makassar and the General Hospital of the Haji Makassar Region

Variable	n	Mean	SD	P-value
Balance				
Pre Test	15	42.13	1,598	0.001 *
Post Test	15	53.00	1,464	
Durability				
Pre Test	15	20.13	1,598	0,000
Post Test	15	31.33	1,447	**
Running Speed				
Pre Test	15	0.482	0.075	0.001 *
Post Test	15	1,034	0.203	
Cognitive Function				
Pre Test	15	25.60	1,595	0.001 *
Post Test	15	30.00	0,000	
Ability to Walk				
Pre Test	15	5.00	0,000	0,000
Post Test	15	7.00	0,000	**

* Wilcoxon test; ** Paired t test

Table 3 shows that there is a significant effect of the pre-test and post-test balance with a value of p = 0.000 (<0.05) from 42.27 ± 1.033 to 43.67 ± 1.175, there is a significant effect of pre and post test endurance. test with a value of p = 0.000 (<0.05) from 20.00 ± 1.309 to 24.20 ± 1.082, there is a significant effect of walking speed pre test and post test with a value of p = 0.001 (<0.05) from 0.457 ± 0.063 to 0.548 ± 0.829, there is a significant effect of cognitive function pre test and post test with a value of p = 0.000 (<0.05) from 26.07 ± 1.831 to 28.20 ± 1.740, there is a significant effect from the ability to walk pre test and post test with a value of p = 0.000 (<0.05) from 5,000 ± 0,000 to 7.00 ± 0,000.

Table 3 The results of the analysis of differences in balance, endurance, walking speed, cognitive function, the ability to walk in patients with post stroke pre test and post test control group at the Special Hospital of South Sulawesi Province Dadi (Stroke Center) Makassar and the General Hospital of the Haji Makassar Region

Variable	n	Mean	SD	P-value
Balance				
Pre Test	15	42.27	1,033	0,000 **
Post Test	15	43.67	1,175	
Durability				
Pre Test	15	20.00	1,309	0,000 *
Post Test	15	24.20	1,082	
Running Speed				
Pre Test	15	0.457	0.063	0.001
Post Test	15	0.548	0.829	**
Cognitive Function				
Pre Test	15	26.07	1,831	

Post Test	15	28.20	1,740	0,000 **
Ability to Walk				
Pre Test	15	5.00	0,000	0,000
Post Test	15	5.60	0.632	**

* Wilcoxon test; ** Paired t test

Table 4 shows the results of the Man Whitney test for hypothesis testing, starting from the comparison of the difference between changes in balance, endurance, walking speed, cognitive function, the ability to walk in the treatment group and the control group, which means that the p value <0.005 means that there is a significant difference between the treatment groups. and the control group for variables of balance, endurance, walking speed, cognitive function, walking ability, the treatment group gave better results than the control group.

Table 4 Differences in the effect of changes in balance, endurance, walking speed, cognitive function, and walking ability of post-stroke sufferers between the two groups at the Special Hospital of South Sulawesi Province Dadi (Stroke Center) Makassar and the General Hospital of the Haji Makassar Region

Variable	n	Mean	SD	P-value
Balance				
Intervention	15	10.87	1,302	0,000 *
Control	15	1.40	0.737	
Durability				
Intervention	15	11.20	1,082	0,000 *
Control	15	4.20	1,207	
Running Speed				
Intervention	15	0.552	0.162	0,000 *
Control	15	0.090	0.072	
Cognitive Function				
Intervention	15	4.40	1,594	0,000 *
Control	15	2.13	1,245	
Running function				
Intervention	15	2,000	0,000	0,000 *
Control	15	0.600	0.632	

Note: * Man Whitney test

4. CONCLUSIONS AND SUGGESTIONS

The provision of Task-Oriented Gait Training affects changes in balance, endurance , walking speed , cognitive function and walking ability in post stroke patients. The level of balance, endurance , walking speed , cognitive function and ability to walk in post stroke patients improved significantly in both study groups . The intervention group gave better results than the control group . This study used only 30 samples, so further research is needed with a large sample size. The results obtained are more accurate. It is necessary to consider adding time to the study to see significant differences in changes in balance, endurance , walking speed , cognitive function and walking ability in post-stroke patients.

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