



The Role of CVA Gymnastics Against Increase Functional Ability of Post Cerebro Vascular Accident Patients

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ABSTRACT

Background Cerebrovascular accident (CVA) has a sudden and severe impact on the blood vessels of the brain. In Indonesia alone, 28.5% of CVA sufferers die and the rest experience paralysis or disability, only 15% can make a full recovery. Cerebrovascular accident (CVA) exercise aims to improve the functional abilities of post-CVA patients. The study aims to determine the difference in the effectiveness of CVA exercise therapy 3 x a week and 4x a week for 12 weeks. Methods The research design used a quasi-experimental approach with a non-random pretest-posttest. The study sample was 44 people who experienced ischemia CVA. data collection using the Barthel Index scale. Results Analysis of data normality with the Shapiro-Wilk test and then paired t-test and Mann-Whitney test. The results of CVA exercise research can improve the functional ability of post-CVA patients with an average increase in CVA exercise 4x and 4x a week is 9.636 ($p=0.000$) and 10.909 ($p=0.000$). However, the difference in functional ability improvement between the two groups of participants was not statistically significant (p -value = 0.198). Conclusion CVA exercise can improve the functional abilities of post-CVA patients.

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Kata kunci:

senam CVA
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pasien paska CVA

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ABSTRAK

Latar belakang Cerebro vascular accident (CVA) memberikan dampak cedera yang berat dan mendadak pada pembuluh-pembuluh darah otak Di Indonesia sendiri, 28,5% penderita CVA meninggal dunia dan sisanya mengalami kelumpuhan atau kecacatan, hanya 15 % saja yang dapat sembuh total. Senam cerebro vascular accident (CVA) bertujuan meningkatkan kemampuan fungsional pasien paska CVA. Penelitian bertujuan untuk mengetahui perbedaan efektifitas terapi senam CVA 3 x seminggu dan 4x seminggu selama 12 minggu. Metode Rancangan penelitian menggunakan quasi eksperimen dengan pendekatan non random pretest-posttest. Sampel penelitian 44 orang yang mengalami CVA iskemia. pengumpulan data menggunakan skala Indeks Barthel. Hasil Analisa normalitas data dengan uji Shapiro-wilk, selanjutnya uji t berpasangan dan uji mann whitney. Hasil penelitian senam CVA dapat meningkatkan kemampuan fungsional pasien paska CVA dengan rerata peningkatan pada senam CVA 4x dan 4x seminggu adalah 9,636 ($p=0,000$) dan 10,909 ($p=0,000$). Akan tetapi, perbedaan peningkatan kemampuan fungsional antara kedua kelompok partisipan tersebut secara statistik tidak signifikan (p value = 0,198). Kesimpulan Senam CVA dapat meningkatkan kemampuan fungsional pasien paska CVA

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INTRODUCTION

Cerebro vascular accident (CVA) is a condition where there is an acute vascular injury in the brain or a severe and sudden injury involving several blood vessels in the brain (Abdullahi, A., Abdu, Y.Y., Aliyu, 2015). Currently, cases of cerebro vascular accident have become a primary neurological problem in the world. In western countries, cerebro vascular accident is the third position as the main disease as a source of death among cases of heart disease and cancer (Mohebi et al., 2020). Every year, there are reports of 800,000 cases of cerebro vascular accident, with details of 600,000 being the first cerebro vascular accident attack and 300,000 other cerebro vascular accident cases being recurrent cerebro vascular accident attacks (Tam & Foo, 2012). Meanwhile in Indonesia alone, 29.5% of cerebro vascular accident sufferers died and the rest experienced paralysis or disability. Only 16% can recover completely from a cerebro vascular accident or disability (Anggiat, L., Hon, W. H. C., Sokran, S. N. B. B. M., & Mohammad, 2020). According to (Whiteside LK, Cunningham RM, Bonar EE, Blow F, Ehrlich P, 2014) revealed that the first influence of healing that cerebro vascular accident sufferers must go through is through treatment and with treatment at the hospital and through rehabilitation. With the right rehabilitation program, 83% of cerebro vascular accident sufferers can walk without assistance, 75% can carry out self-care activities, and the other 35% can return to work ((Bhalerao, G.V., Kulkarni, V., Kapoor, 2021). Among the forms of rehabilitation therapy that are often carried out are physical exercise programs or physiotherapy.

At the time of this therapy, cerebro vascular accident sufferers carry out functional exercises and identify the main key activities in certain motor activities such as sitting, talking, or walking (Spear & Ph, 2013). Each motor activity activity is analyzed, determines the components that cannot be done, then provides training to the patient to do these things, and ensures that this exercise is carried out in the patient's daily activities (Bhalerao, G.V., Kulkarni, V., Kapoor, 2021).

The management of the physical exercise program or physiotherapy is focused on daily activities such as eating and drinking, bathing, dressing, decorating, using the toilet, controlling urination and defecation, moving places, walking mobility, and using stairs (Boehme, A.K., Esenwa, C., Elkind, 2017). Physical exercise is very beneficial for body fitness, besides that it is also useful for stabilizing the function of human organ systems.

Physical exercise also has a very important role in maintaining muscle function in the human body (Chen, L., Xiong, S., Liu, Y., Lin, M., Zhu, L., Zhong, R., 2018).

After conducting a literature review, the researchers showed that only doing treadmill training and water-based aerobics was able to improve the condition of neuromusculo-skeletal function ability, Van Duijnhoven, R.J.H., Heeren, A., Peters, M.A.M., Veerbeek, M.J., Kwakkel, G., Geurts, H.C.A., et al (2016) as well as physiotherapy which has been proven empirically to be able to improve the patient's functional abilities (Ezema, C.I., Nweke, M.C., Uroko, S.U., Uduonu, E.M., Uchenwoke, 2018). In addition, studies with the same aim using cerebro vascular accident exercise have not been found.

Researchers have the thought that physical exercise, namely cerebro vascular accident gymnastics also has the same potential as other physical therapy, to be used in improving the functional abilities of post-cerebro vascular accident patients. Opinion (Feigin, V.L., Norrving, B., Mensah,

2017) stated that cerebro vascular accident exercise is a form of physiotherapy exercise that is structured in such a way as to be able to provide a stimulus to several receptors which will be brought to the brain so that it is processed to create output in the form of coordinated movements (Abdullahi, A., Abdu, Y.Y., Aliyu, 2015). There are three parts to the cerebro vascular accident exercise, namely (warm up, core, and cool down) and this practice uses more of the organs of the hands, head, neck, shoulders, buttocks, knees, legs and feet.

Improving the ability of muscle strength in each organ that is given warm-up exercises and core movements will improve the patient's functional abilities in carrying out daily activities such as eating, washing face, brushing teeth, bathing, dressing, and walking. When conducting an initial survey when there was a cerebro vascular accident exercise at IRM RSUD Dr. Soebandi Jember, researchers obtained information on the picture that participants in the cerebro vascular accident exercise were never given notes about the progress/improvement of their functional abilities after undergoing the cerebro vascular accident exercise.

Executing Therapist at IRM RSUD Dr. Soebandi Jember also confirmed that so far there has been no systematic recording of the progress of the functional abilities of post-cerebro vascular accident patients undergoing cerebro vascular accident exercise therapy.

When the researchers conducted and tried to collect data and document their own progress in the condition of functional abilities of 7 patients whose identities were kept confidential, it turned out that 5 out of 7 patients (68%) experienced an increase in functional abilities by 8 points. According to the researcher, this finding is an indication that there is a positive effect between cerebro vascular accident exercise and the improvement of the functional ability of post-cerebro vascular accident patients (Haghighi, S., Vahdati, S.S., Mikaeilpour, A., Ramouz, 2017).

This study aims to obtain empirical evidence of the effectiveness of cerebro vascular accident exercise therapy in improving the functional abilities of patients after a cerebro vascular accident.

METHODS

The research design used a quasi-experimental approach with a non-randomized comparison group pretest-posttest design (Setyosari, 2013). All groups of study respondents were pretested and posttested to measure the functional abilities of patients before and after undergoing cerebro vascular accident exercise therapy 3x and 4x a week for 12 weeks. The place of research is the Medical Rehabilitation Installation (IRM) of RSUD Dr. Soebandi Jember. The research time is 12 weeks, namely October 3 2021- December 4 2021.

The research sample was 44 post-cerebro vascular accident patients who visited the IRM of RSUD Dr. Soebandi Jember, who were taken based on accidental sampling technique and met the inclusion and exclusion criteria as follows: all participants were post-cerebro vascular accident ischemia, stable general condition (BP \leq 130/80 mmHg, no dizziness, and RR: 16 -22x/minute), patients with hemiparesis.

Data collection was carried out on 22 post-cerebro vascular accident patients who were divided into 2 groups. The first group (consisting of 22 people) underwent cerebro vascular accident exercise therapy 3x a week on Monday, Wednesday and Friday morning at 09.30-10.30 WIB. While the second group (also consisting of 22 people) underwent

cerebro vascular accident exercise therapy 4x a week on Mondays, Wednesdays, Thursdays and Saturday afternoons at 16.30-17.30 WIB. The time for each session of cerebro vascular accident exercise therapy is 60 minutes.

The instrument uses a Barthel Index sheet which is used to measure the functional abilities of research respondents. The received data is then processed univariately using a frequency distribution, before proceeding with the bivariate test, the Shapiro Wilk test is first performed to see the normality of the data distribution. Data processing was carried out bivariately using paired t test and Mann-Whitney test (Tegeh, 2014).

Paired t-test was conducted to analyze the differences in Barthel index scores before and after cerebro vascular accident exercise 3 times a week and the differences in Barthel index scores before and after exercise therapy 4 times a week. The Mann-Whitney test was conducted to analyze the differences in the difference in the Barthel index score before and after cerebro vascular accident exercise therapy 3x a week and the difference in the Barthel index score before and after cerebro vascular accident exercise therapy 4x a week.

RESULTS AND DISCUSSION

The research data in Table 1 and Table 2 show that cerebro vascular accident exercise therapy 3x a week can improve the patient's functional improvement. The results of this data can be seen from the average functional ability of the patients which was measured using the Barthel Index at the posttest (87.6) and the results were 9.7 points higher than during the pretest (77.9). The increase is statistically significant (p-value = 0.000). The highest improvements in functional ability in patients in this group were found in dressing activities, walking activities on flat surfaces, and activities on the toilet. Accumulatively, only 10 out of 22 patients were able to obtain optimum improvements in functional ability after carrying out cerebro vascular accident exercise therapy 3 times a week, which was reflected in the number of patients who were able to obtain a maximum Bartel Index score (20 or 30) or were able to do it independently each time. observed activities of daily living.

Table 1.
Average Functional Ability of Patients Post Cerebro vascular accident Before and After Doing Exercise Therapy Cerebro vascular accident 3x a week

Functional Capability	Mean	SD	P-value	N
Before cerebro vascular accident exercise therapy (pretest)	77,9	5,7	0,000	22
After cerebrovascular accident exercise therapy (posttest)	87,6	7,3		22

*Significant at $\alpha < 0.05$

Table 2.
Functional Ability of Patients Before and After Following Cerebro vascular accident Exercise Therapy 3x a week

No	Functional Ability Activities	Pretest		Posttest	
		F	%	F	%
1.	Eat				
	a. With the help of	14	63,6	10	45,4
	b. Independent	8	36,4	12	54,6
	Total	22	100,0	100	100,0
2.	Transfer from wheelchair to bed				
	a. With the help of	0	0	0	0
	b. Independent	22	100,0	22	100,0
	Total	22	100,0	100	100,0
3.	Personal hygiene				
	a. With the help of	0	0	0	0
	b. Independent	22	100,0	22	100,0
	Total	22	100,0	100	100,0
4.	Activity in the toilet				
	a. With the help of	10	45,6	2	9,1
	b. Independent	12	54,4	20	90,9
	Total	22	100,0	22	100,0
5.	Bath				
	a. With the help of	0	0	0	0
	b. Independent	22	100,0	22	100,0
	Total	22	100,0	22	100,0
6.	Walk on a flat surface				
	a. With the help of	18	81,8	10	45,6
	b. Independent	4	18,2	12	54,4
	Total	22	100,0	22	100,0
7.	Ability to climb stairs				
	a. Not capable at all	22	100,0	12	54,4
	b. With the help of	0	0	10	45,6
	c. Independent	0	0	0	0
	Total	22	100,0	22	100,0

8.	get dressed				
	a. With the help of	10	63,4	6	27,4
	b. Independent	12	36,6	16	72,6
	Total	22	100,0	22	100,0
9.	Controlling stools				
	a. With the help of	0	0	0	0
	b. Independent	22	100,0	22	100,0
	Total	22	100,0	22	100,0
10.	Control urine				
	a. With the help of	0	0	0	0
	b. Independent	22	100,0	22	100,0
	Total	22	100,0	22	100,0

The findings of this study are consistent with research findings (Haghighi, S., Vahdati, S.S., Mikaeilpour, A., Ramouz, 2017), as well as research results by (Kannabiran, B., Cathrine, S., Nagarani, R., Senthil, R.K., Sahayaraj, 2016). About the positive contribution of physical exercise therapy to improve the functional abilities and motor skills of patients after a cerebro vascular accident (Bridges L, 2017). The increase in the functional ability of patients after doing cerebro vascular accident exercise therapy 3 times a week was caused by an increase in muscle mass, which was obtained after doing regular physical exercise. Opinion from the results of research by (Kim, B., Lee, J., Sohn, M.K., Kim, D.Y., Lee, S., Shin, Y., Oh, G., 2017) shows that from the results of adjustments to physical exercise that are carried out regularly within a certain period of time it proves the form of an increase in muscle mass. With an increase in muscle mass, muscle strength increases (van Duijnhoven, R.J.H., Heeren, A., Peters, M.A.M., Veerbeek, M.J., Kwakkel, G., Geurts, H.C.A., 2016). This increase in muscle function has led to an increase in the functional ability of post-cerebro

vascular accident patients, so that they are more agile in their movements and react quickly.

The research data in Table 3 and Table 4 show that cerebro vascular accident exercise therapy 4x a week is more optimal in improving and increasing the patient's functional abilities. This can be seen from the average functional ability of patients measured using the Barthel index at the time of the posttest (93.9) which was 11 points higher than during the pretest (82.9). This increase in ability is statistically significant (p -value = 0.000). The most rapid improvement in functional ability in patients in this group was found in eating activities, toilet activities, walking on a flat surface, and dressing (Powers, S. K., Radak, Z., & Ji, 2016). Accumulatively, 18 out of 22 patients were able to achieve optimum improvement in functional ability after undergoing cerebro vascular accident exercise therapy 4x a week, which was reflected in the number of patients who were able to obtain a maximum Barthel index score (20 or 30) or patients who were able to carry out all activities independently. observed daily life.

Table 3.
Average Functional Ability of Patients Post Cerebro vascular accident Before and After Doing Exercise Therapy Cerebro vascular accident 4x a week

Functional Capability		Mean	SD	P-value	N
Before cerebro vascular accident exercise therapy (pretest)		82,9	5,6	0,000	22
After cerebrovascular accident exercise therapy (posttest)		93,9	6,1		

Table 4.
Functional Ability of Post Cerebro Vascular Accident Patients Before and After Following Cerebro Vascular Accident Exercise Therapy 4x a week

No	Functional Ability Activities	Pretest		Posttest	
		F	%	F	%
1	Eat				
	a. With the help of	10	45,6	0	0
	b. Independent	12	54,4	22	100,0
	Total	22	100,0	100	100,0
2	Transfer from wheelchair to bed tidur				
	a. With the help of	0	0	0	0
	b. Independent	22	100,0	22	100,0
	Total	22	100,0	100	100,0
3	personal hygiene				
	a. With the help of	0	0	0	0
	b. Independent	22	100,0	22	100,0
	Total	22	100,0	100	100,0
4	Activity in the toilet				
	a. With the help of	8	36,6	0	0
	b. Independent	14	63,4	22	100
	Total	22	100,0	22	100,0
5	Bath				

	a. With the help of	0	0	0	0
	b. Independent	22	100,0	22	100,0
	Total	22	100,0	22	100,0
6	Walk on a flat surface				
	a. With the help of	8	36,6	2	1,9
	b. Independent	14	63,4	20	90,1
	Total	22	100,0	22	100,0
7	Ability to climb stairs				
	a. Not capable at all	22	100,0	10	45,4
	b. With the help of	0	0	6	27,3
	c. Independent	0	0	6	27,3
	Total	22	100,0	22	100,0
8	get dressed				
	a. With the help of	12	54,6	2	1,9
	b. Independent	10	45,4	20	91,1
	Total	22	100,0	22	100,0
9	Controlling stools				
	a. With the help of	0	0	0	0
	b. Independent	22	100,0	22	100,0
	Total	22	100,0	22	100,0
10	Control urine				
	a. With the help of	0	0	0	0
	b. Independent	22	100,0	22	100,0
	Total	22	100,0	22	100,0

The findings of this study strengthen the statement (Krukowska, J., Bugajski, M., Sienkiewicz, M., Czernicki, 2016) that an increase in functional status improvement will generally reach an optimal point in post-cerebro vascular accident patients, namely during the third to fourth months after doing physical exercise therapy (Abdullahi, A., Abdu, Y.Y., Aliyu, 2015)(Abdullahi, A., Abdu, Y.Y., Aliyu, 2015). The findings of this study support the statement from (Luklukaningsih, 2017) that like any form of physical exercise, as long as it is done regularly with a frequency of between 3-5 times a week it will produce better physical fitness, health, and recovery than just doing it once a week (Saputri et al., 2019)(Abdullahi, A., Abdu, Y.Y., Aliyu, 2015). The findings of this study also strengthen the statement from (Parmar, 2018) that the positive impact of regular physical exercise will be seen if the physical exercise is carried out 3-5 times a week for 3 to 4 weeks (Haghighi, S., Vahdati, S.S., Mikaeilpour, A., Ramouz, 2017)(Whiteside LK, Cunningham RM, Bonar EE, Blow F, Ehrlich P, 2014).

There is a greater number of patients who get an increase in optimum functional ability after carrying out cerebro vascular accident exercise therapy 4x a week compared to 3x a week due to the frequency of physical exercise therapy which causes a greater amount of muscle mass. (Foskett A, Ali A, 2019)(Jeihooni et al., 2018) increases more as a result of the functional strength obtained by the patient becomes greater to carry out activities of daily living to be greater. As

explained by (Patricia, H., Kembuan, M.A.H.N., Tumboimbela, 2015), the occurrence of cerebro vascular accident cases is caused by a blockage or rupture of blood vessels in the organ area of the brain which results in communication pathways to the brain area not running smoothly or being obstructed (Chen, L., Xiong, S., Liu, Y., Lin, M., Zhu, L., Zhong, R., 2018)(Javadzadeh HA, Mostafavi F, Reesi M Mahaki B, 2015). This is what causes a decrease in the patient's ability to carry out activities of daily living independently (Spear & Ph, 2013)(Westfall, T.C., and Westfall, 2011). By itself the physical exercise given to patients after a cerebro vascular accident is first aimed at luring back or stimulating the damaged nerves to recover first, then followed by an increase in muscle strength (Fikri, 2017)(Rabadán, M., Díaz, V., Calderón, F. J., Benito, P. J., Peinado, A. B., & Maffulli, 2011). The relatively short or infrequent frequency and duration of physical exercise causes the process of recovering muscle strength not to run optimally (Sakakibara, B.M., Kim, A.J., Eng, 2017)(Spear & Ph, 2013).

The research data in Table 5 shows that from the statistical test results, the p-value = 0.000 is obtained. This means that at an alpha of 5% it shows that there is a significant difference in the increase in the patient's functional abilities between patients who take part in cerebro vascular accident exercise therapy 3x a week and those who do 4x a week.

Table 5.
Differences in the Improved Functional Ability of Post Cerebro vascular Accident Patients Between Those Undergoing Cerebro vascular Accident Exercise Therapy 3x a week and 4x a week

Patient function	Minimum	Median	Maksimum	P-value	N
Cerebro vascular accident exercise 3x / week	5	5	12	0,000	22
Cerebro vascular accident exercise 4x / week	5	10	20		22

*Significant at $\alpha < 0.05$

The results of the analysis show that there is very significant evidence of an increase in the functional ability of patients between patients who do cerebro vascular accident

exercise therapy 3x a week and 4x a week in this study as evidenced by the different types of daily living activities that can be carried out independently by groups of patients who

have undergone exercise therapy cerebro vascular accident 3x a week with 4x a week (Krukowska, J., Bugajski, M., Sienkiewicz, M., Czernicki, 2016). The increase in functional ability to carry out activities of daily living in the two groups showed that there were differences in the 5 types of activities of daily living, namely (1) eating, (2) activities in the toilet, (3) walking on a flat surface, (4) going up and down stairs, and (5) get dressed (Sadeghi K, Ahmadi SM, 2017)(Rabinowitz JA, Drabick DA, Reynolds MD, Clark DB, 2016) (ġmamoġluM, 2019). Researchers suspect that the difference in the frequency of exercise that occurs in the two groups (3x and 4x a week), as well as the different duration of therapy (4x a week or 3 months) causes a real difference in the increase in the functional ability of patients in the two groups.

CONCLUSIONS AND SUGGESTIONS

Cerebro vascular accident exercise therapy is proven to be effective in increasing and improving the functional abilities of patients after a cerebro vascular accident ischemia, whether it is done 3x a week or 4x a week. Differences in functional ability improvement also occurred in the two groups of patients who underwent cerebro vascular accident exercise therapy 3x and 4x a week.

Based on the findings of this study, the researchers suggested that cerebro vascular accident exercise therapy be implemented 4x a week and guidelines for its implementation in the form of SOPs. Furthermore, increasing the duration of cerebro vascular accident exercise therapy to match what is applied, namely 12 weeks (3 months) and the frequency is between 4-5 times a week to ensure that all patients get the maximum increase in functional abilities.

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