

# Effectiveness of Task Related Exercise on Arm and Hand Function and Biochemical Parameter among Stroke Patient

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## ABSTRACT

Stroke is medically known as cerebrovascular accident (CVA) which is defined as a sudden loss of function caused by injury to the brain (hemorrhagic stroke) and lack of blood supply to the brain (ischemic stroke) causes weakness of muscle especially on one side of the body, confusion, problem in speaking, visual disturbances, difficulty in walking, sudden severe headache which results in long term disability. So present study aims to assess the effect of task related exercise on arm and hand function and biochemical parameter among stroke patient in selected ward at Saveetha Medical College and Hospital, Thandalam. A quantitative research approach with quasi experimental research design was adopted to conduct the study among 30 stroke patients and was assign to experimental group 15 patients and control group 15 patients who are selected by purposive sampling technique. Structured questionnaire method was used to collect the demographic variables and clinical variables. The pre-interventional arm and hand function and biochemical parameter level was assessed using Chedoke Arm and Hand Activity Inventory Score. Task oriented training was provided to the subjects in experimental group daily for 5 days in a week for 15 minutes, for 4 weeks and posttest level of arm and hand function was assessed in both the groups. The obtained data was analyzed using descriptive and inferential statistics. The results of the study shows that among 30 patients in experimental group patients proves the demographic variable gender ( $\chi^2=4.615$ ,  $p=0.032$ ) had shown statistically significant association with posttest level of arm and hand function among stroke patients in the experimental group at  $p<0.05$  level. The clinical variable patients Glass cow coma scale score ( $\chi^2=9.231$ ,  $p=0.010$ ) had shown statistically significant association with posttest level of arm and hand function among stroke patients in the experimental group at  $p<0.01$  level. In hence the finding of the study shows that the task related exercise was effective in improving the arm and hand and biochemical parameters of stroke patients.

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**KEYWORDS:** arm and hand function, biochemical parameter, task related exercise

## INTRODUCTION

Stroke has been a major health problem in India. Stroke burden in India is increasing in the last few decades, in contrast to developed countries where it has decreased. At present the average annual incidence rate of stroke in India is 145 per 100,000 populations, which is greater than the western nations. Approximately, 12% of all strokes occur in the population <40 years of age. From the current Indian population of about 1.2 billion, approximately 1.8 million people may suffer from stroke annually

and about one-third of them may die. The incidence of cerebrovascular accidents increases with age and the number of strokes is projected to increase as the elderly population grows. Approximately 90% of patients who have survived following a stroke have difficulties in motor control and balance functions hemiparesis or hemiplegia is one of the most common symptoms secondary to stroke, especially on the opposite side of the lesion that can cause deficiencies in movement, sensation, speech, cognition,

perception, and balance. The most common symptom of a stroke is sudden weakness or numbness of the face, arm or leg, most often on one side of the body. Other symptoms include: confusion, difficulty speaking or understanding speech; difficulty seeing with one or both eyes; difficulty walking, dizziness, loss of balance or coordination; severe headache with no known cause; fainting or unconsciousness. Task-oriented training involves practicing real-life tasks (such as walking or answering a telephone), with the intention of acquiring or reacquiring a skill (defined by consistency, flexibility and efficiency). The tasks should be challenging and progressively adapted and should involve active participation. It is important to note that it differs from repetitive training, where a task is usually divided into component parts and then reassembled into an overall task once each component is learned. Repetitive training is usually considered a bottom-up approach, and is missing the end-goal of acquiring a skill. Task-oriented training can involve the use of a technological aid as long as the technology allows the patient to be actively involved. Task-oriented training is also sometimes called task-specific training, goal-directed training, and functional task practice.

#### Methods and materials:

Quantitative approach was adopted in this study and research design quasi experimental was used to assess the effect of task related exercise on arm and hand function and biochemical parameter among stroke patient. 50 samples are selected by using purposive sampling technique. The sample size comprised of 30 patients in which 15 in experimental group and 15 in control group. Inclusion criteria for Patients who were diagnosed to have stroke with balance problem, Patients should have functional disability, Stroke Patients with good cognition able to follow the examination, Patients with mild stroke. Exclusion criteria for Patients who are not able to follow verbal commands, Disoriented and critically ill patients, Patients with flaccid paralysis, Patient with acute stage of stroke, those who are not willing to participate. The data collection period was done with prior permission from the Saveetha Medical College and Hospital and ethical clearance was obtained from the institution. The study purpose was explained and a written informed consent was obtained from them. The structured questionnaire to obtain demographic and clinical data. The sample is explained before doing the exercise, as followed by task related Exercise for 15 minute. The samples were advised to do this exercise daily for 5 days in a week for 15

minutes, for 4 weeks, the post-test was conducted to assess the level of arm and hand function and biochemical parameter by using Chedoke Arm and Hand Activity Inventory Score. The control group was received only regular treatment. The data were tabulated and analyzed by frequency and percentages, standard deviation, and mean. The chi square and one way ANOVA was used to association of level of arm and hand function and posttest biochemical parameters score among stroke patients with their selected demographic and clinical variables.

#### Results and Discussion:

**Section A:** Results revealed that frequency and distribution of demographic variables among stroke patients out of 30 samples in the experimental group (15), 7(46.7%) were aged between 61 – 65 years, 10(66.7%) were male, 13(86.7%) were married, 11(73.3%) belonged to nuclear family, 5(33.3%) had middle school education and 6(40%) were agriculturist. Whereas in the control group (15), 7(46.7%) were aged between 51 – 60 years, 8(53.3%) were male, 11(73.3%) were married, 8(53.3%) belonged to nuclear family, 6(40%) had no formal education and 8(53.3%) were employed / housewives.

**Section B:** Results revealed that Frequency and percentage distribution of clinical variables of stroke patients. Out of 30 samples in the experimental group, 10(66.7%) had ischemic stroke, 9(60%) had left side of upper limb affected, 8(53.3%) had stroke for >3 months, 7(46.7%) had a glass cow coma scale score between 10 – 12, 9(60%) had right hemisphere part of the brain affected and 8(53.3%) had diabetes and hypertension as co-morbidities. Whereas control group, 08(53.3%) had ischemic stroke, 07(46.7%) had left side of upper limb affected, 8(53.3%) had stroke for >3 months, 7(46.7%) had a glass cow coma scale score between 10 – 12, 9(60%) had right hemisphere part of the brain affected and 6(40%) had diabetes and hypertension as co-morbidities.

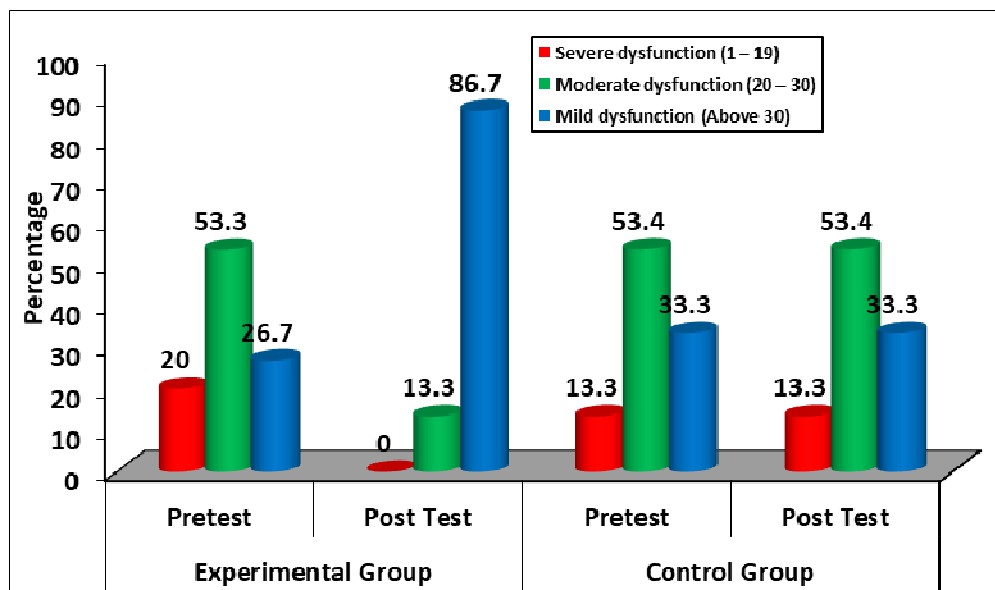
**Section C:** table 1 Frequency and percentage distribution of level of arm and hand function among stroke patients in the experimental and control group.

Out of 30 patients in the pretest of experimental group (15), 8(53.3%) had moderate dysfunction, 5(26.7%) had mild dysfunction and 3(20%) had severe dysfunction whereas in the posttest 13(86.7%) had mild dysfunction and 2(13.3%) had moderate dysfunction. In the pretest and posttest of control group (15), 8(53.4%) had moderate dysfunction, 5(33.3%) had mild dysfunction and 2(13.3%) had severe dysfunction.

**Table 1: Frequency and percentage distribution of level of arm and hand function among stroke patients in the experimental and control group.**

n = 30(15+15)

Level of Arm and Hand Function	Experimental Group				Control Group			
	Pretest		Post Test		Pretest		Post Test	
	F	%	F	%	F	%	F	%
Severe dysfunction (1 – 19)	3	20.0	0	0	2	13.3	2	13.3
Moderate dysfunction (20 – 30)	8	53.3	2	13.3	8	53.4	8	53.4
Mild dysfunction (Above 30)	5	26.7	13	86.7	5	33.3	5	33.3



**Fig 1: Bar diagram showing percentage distribution of level of arm and hand function among stroke patients in the experimental and control group**

**Table 2: Association of posttest level of arm and hand function and posttest biochemical parameters score among stroke patients with their selected demographic variables in the experimental group.**

n= 15

Demographic Variables	F	Arm and Hand function	Creatinine Kinase
		Chi-Square & p-value	Oneway ANOVA & p-value
<b>Age in years</b>			
40 – 45 years	3	$\chi^2 = 1.813$ d.f=3 p=0.613 N.S	F = 0.740 p=0.550 N.S
46 – 50 years	1		
51 – 60 years	4		
61 – 65 years	7		
<b>Gender</b>		$\chi^2 = 4.615$ d.f=1 p=0.032 S*	t = 1.095 p=0.311 N.S
Male	10		
Female	5		
<b>Marital status</b>			
Married	13	$\chi^2 = 2.685$ d.f=1 p=0.101 N.S	t = 0.994 p=0.442 N.S
Unmarried	2		
Widow/Widower	0		
Divorced / Separated	-		
<b>Type of family</b>			
Nuclear family	11	$\chi^2 = 0.839$ d.f=1 p=0.360 N.S	t = 0.895 p=0.420 N.S
Joint family	4		
Extended family	0		

<b>Educational status</b>		$\chi^2 = 1.587$ d.f=4 p=0.811 N.S	F = 0.343 p=0.843 N.S
No formal education	4		
Primary school	1		
Middle school	5		
High school	4		
Under graduate	-		
Post graduate	1		
<b>Occupational status</b>		$\chi^2 = 3.462$ d.f=4 p=0.484 N.S	F = 0.144 p=0.962 N.S
Government	2		
Private	3		
Unemployment/Housewife	3		
Business / Self employed	1		
Agriculture	6		
Retired	-		

\* $p < 0.05$ , S – Significant, N.S – Not Significant

The table 2 shows that the demographic variable gender ( $\chi^2=4.615$ ,  $p=0.032$ ) had shown statistically significant association with post test level of arm and hand function among stroke patients in the experimental group at  $p < 0.05$  level. The table 1 shows that none of the demographic variables had shown statistically significant association with post test creatinine kinase score level among stroke patients in the experimental group.

**Table 3: Association of posttest level of arm and hand function and posttest biochemical parameters score among stroke patients with their selected clinical variables in the experimental group.**

n = 15

Clinical Variables	F	Arm and Hand function	Creatinine Kinase
		Chi-Square & p-value	One way ANOVA & p-value
<b>Types of stroke according to cause</b>		$\chi^2 = 0.288$ d.f=1 p=0.591 N.S	t = 1.761 p=0.115 N.S
Ischemic stroke	10		
Hemorrhagic stroke	5		
<b>Side of affected upper limb</b>		$\chi^2 = 3.462$ d.f=1 p=0.063 N.S	<b>t = 3.948</b> <b>p=0.002</b> <b>S**</b>
Right side	6		
Left side	9		
<b>Duration of stroke</b>		$\chi^2 = 0.010$ d.f=1 p=0.919 N.S	t = 0.188 p=0.854 N.S
<3 months	7		
>3 months	8		
<b>Patients Glasscow coma scale score</b>		$\chi^2 = 9.231$ d.f=2 <b>p=0.010</b> <b>S**</b>	F = 2.011 p=0.176 N.S
6 – 8	3		
8 – 9	5		
10 – 12	7		
<b>Part of the brain is affected</b>		$\chi^2 = 3.462$ d.f=1 p=0.063 N.S	<b>t = 3.948</b> <b>p=0.002</b> <b>S**</b>
Right hemisphere	9		
Left hemisphere	6		
<b>Co-morbidities</b>		$\chi^2 = 2.019$ d.f=2 p=0.364 N.S	F = 1.396 p=0.285 N.S
Hyperlipidemia	-		
Diabetes	4		
Hypertension	3		
Diabetes and hypertension	8		

\*\* $p < 0.01$ , S – Significant, N.S – Not Significant

The table 3 shows that the clinical variable patients Glasscow coma scale score ( $\chi^2=9.231$ ,  $p=0.010$ ) had shown statistically significant association with posttest level of arm and hand function among stroke patients in the

experimental group at  $p < 0.01$  level. The table 3 shows that the clinical variable side of affected upper limb ( $t=3.948$ ,  $p=0.002$ ) and part of the brain in affected ( $t=3.948$ ,  $p=0.002$ ) had shown statistically significant association with posttest level of creatinine kinase score among stroke patients in the experimental group at  $p < 0.01$  level.

### Conclusion:

In hence the finding of the study shows that the task related exercise was effective in improving the arm and hand and biochemical parameters of stroke patients.

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### Author's contribution

All the authors actively participated in the work of the study. All authors read and approved the final manuscript.

### Conflict of interest

The authors declare no conflicts of interest.

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