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Effect of Graded Repetitive Arm Supplementary Programme (GRASP) on Upper Limb Function among Stroke patients

Priyanka Noble Ms
Government College of Nursing, Thiruvananthapuram, Kerala, India

Sindhu L Ms
Government College of Nursing, Thiruvananthapuram, Kerala, India, sindhulalithambika@gmail.com

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Cover Page Footnote

We would like to thank Dr Thomas Iype, Professor& Head, Dept. of Neuromedicine, Medical College Hospital, Thiruvananthapuram for his guidance and also thankful to all the patients for their kind participation

Original Article

Effect of Graded Repetitive Arm Supplementary Programme (GRASP) on Upper Limb Function among Stroke patients

Priyanka Noble, Sindhu L*

Email: sindhulalithambika@gmail.com

Abstract

Introduction: Stroke is the rapid loss of brain function due to disturbance in the blood supply to the brain. More than 70 % of individuals who have a stroke experience upper limb deficits that impact daily activities. The objective of this study was to evaluate the effect of GRASP on upper limb function among patients with stroke. **Methods:** It was a quasi-intervention pretest-posttest control group design. The sample consisted of 61 patients with stroke, 31 in the intervention and 30 in the control group attending the outpatient Department of Neurology, Medical College Hospital, Thiruvananthapuram. The upper limb function of patients was determined by CAHAI- 8 (The Chedoke Arm and Hand Activity Inventory – 8) and ARAT (The Action Research Arm Test). The researcher taught and demonstrated GRASP to the patients in the intervention group whereas patients in the control group were given only the routine treatment. During the next follow up (4 weeks after intervention), the effect of GRASP on upper limb function was assessed using the same tool and compared with that of the control group. **Result:** The mean difference in the pre-test- post-test score of CAHAI- 8 was 11.29±3.4 for the intervention group whereas it was only 5.93±3.3 for the control group ($p < .05$). The mean difference in the pretest- posttest score of ARAT was 12.58±3.0 for the intervention group whereas it was only 6.86±1.9 for the control group ($p< .01$). **Conclusion:** The result showed that GRASP improved the upper limb function of patients with stroke in subacute phase and the nurses who work in these areas should incorporate it as a nursing intervention.

Key words: GRASP, upper limb function, stroke

Introduction

Stroke is a catastrophic event that affects all aspects of an individual's life (Almborg, Ulander, Thulin, & Berg, 2010). It is the leading cause of adult disability and dependence. It is the second leading cause of death worldwide. The incidence of stroke in India is around 130 per 100,000 people every year (Ezzati et al., 2004).

Stroke leaves nearly about 50% of its survivors disabled as to arm-handed performance, for the rest of their lives (Guracy, Bal, & Cakci, 2009).

Priyanka Noble[1], Sindhu L[2]

1. Post graduate student, Government College of Nursing, Thiruvananthapuram, Kerala, India.

2. Assistant Professor, Government College of Nursing, Thiruvananthapuram, Kerala, India.

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*Corresponding Author

With the increase in stroke incidence and prevalence, problems of arm-handed performance are likely to occur more frequent which increase the burden of disease (Feys et al., 1998). There is evidence to suggest that regaining lost function in the upper extremities may be more difficult to achieve than the return of lower extremity function (Nakayama, Jørgensen, Raaschou, & Olsen, 1994). Still, a variety of treatment interventions to improve motor recovery of the upper extremity is used currently. GRASP is one such self-directed, home-based arm and hand exercise programme done by the patient independently or with their family which have proven effectiveness in improving upper extremity function. The effect of GRASP in improving the use of paretic upper limb and grip strength in a patient after stroke has been proved (Harris, Eng, Miller, & Dawson, 2009). In addition, GRASP is found to be effective in alleviating the depressive symptoms in post-

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stroke patients. Therefore, the investigators intended to replicate the effect of GRASP in the population under study.

Methods

A quantitative research approach was adopted for the study with quasi-experimental pretest - post-test control group design. The sample size consisted of 61 patients i.e., 31 in the intervention group and 30 in the control group. The study participants were recruited consecutively, who met the inclusion and exclusion criteria. Patients who had an ischemic stroke within three months with Fugl Meyer Score (FMA) between 26–45 attending the outpatient Department of Neurology, Govt. Medical College Hospital, Thiruvananthapuram were selected for the study. FMA is a stroke-specific performance-based impairment index with a maximum sum score of 66. Patients' with receptive aphasia, orthopaedic or joint injuries and both upper limb affected were excluded. The researcher collected socio-demographic data and clinical data from the patient using a semi structured interview schedule after obtaining written informed consent from the patients.

The pre-test scores of the upper limb function were determined by CAHAI–8 and ARAT. CAHAI – 8 is a standardized, validated, upper limb measure that uses an eight-point quantitative scale in order to assess functional recovery of the arm and hand after a stroke. The maximum possible score is 56. ARAT is a standardized and valid measure in evaluating the upper extremity function of patients after stroke. ARAT contains 19 items and is divided into 4 subscales – grasp, grip, pinch and gross motor – with the maximum score of 57 GRASP – level 2 exercise - is a self - directed, home-based arm and hand exercise which is done independently by the patient with minimal supervision by the therapist.

The investigator taught and demonstrated GRASP individually to patients in the intervention group as well as their caregivers. An exercise kit along with a leaflet explaining the exercises was also distributed on the day of the demonstration. Patients were instructed to practise each exercise five times, twice daily for a period of four weeks. They were asked to record the exercise in a homework exercise diary. The caretaker was entrusted to supervise the exercise. Reinforcement was given via phone calls every week. The control group was given only the routine treatment. At the end of the fourth week, they were asked to report to the Neurology Outpatient Department for review. The researcher evaluated the effect of intervention using the same scales CAHAI – 8 & ARAT (post-tes) in both the intervention and control group. The data collection period was 3 months and the average time taken for intervention was 30 – 40 minutes for each patient. Control group patients were taken during the initial half of the study period in order to avoid contamination. Formal approval was obtained from the institutional ethics committee prior to the conduct of the study.

Data were analyzed using SPSS–16 version for descriptive and inferential statistics.

Results

Table 1:

Frequency and Percentage Distribution of Sample Characteristics

N= 31+30=61

Sample Characteristic	Group		Frequency	(%)
Age	Intervention	40 – 50	8	25.8
		51-60	16	51.6
		61-70	7	22.5
	Control	40 – 50	6	20.0
		51-60	17	56,6
		61-70	7	23.3
Gender	Intervention	Male	26	83.9
		Female	5	16.1
	Control	Male	23	76.7
		Female	7	23.3
Marital status	Intervention	Married	25	80.6
	Control	Married	25	83.3
Education	Intervention	Secondary education	14	45.2
	Control		16	53.3
Residence	Intervention	Rural	25	80.6
	Control	Rural	22	73.3

Among the study participants, 29.0% of patients in the intervention group and 40.0% of patients in the control group were in the age group of 51 – 55 years. 83.9% of patients in the intervention group and 76.7 % of patients in the control group were males. Majority of the patients in both the intervention group (80.6%) and

Table 2:
Comparison of Pre-test and Post-test Scores between Intervention Group and Control Group

N=61

Mean		Intervention Group				Control group			
		SD	't' value	'P' value	Mean	SD	't' value	'P' value	
CAHAI - 8	Pre	22.23	1.31	9.55	0.01	22.07	1.47	6.94	0.02
	Post	33.52	3.97			28.0	3.95		
ARAT	Pre	29.64	2.17	10.46	0.01	30.54	2.05	7.54	0.02
	Post	42.25	4.47			37.3	3.13		

Table 3:
Effect of GRASP on Functions of Upper Limb among Stroke Patients

N=61

Scores		Mean difference	SD	't' value	'P' value
CAHAI 8	Intervention group	11.29	3.4	6.28	0.01
	Control group	5.93	3.3		
ARAT	Intervention group	12.61	3.0	8.85	0.01
	Control group	6.79	1.9		

control group (83.3%) were married. 45.2% of patients in the intervention group and 53.3% of the patients in the control group had secondary school education. With respect to the area of residence, 80.6% of patients in the intervention group and 73.3% of patients in the control group were residing in rural areas.

With regard to co morbidity, 87.1% of patients in the intervention group and 86.7% in the control group were hypertensive and 45.2% and 60.0% in the intervention and control group respectively were having diabetes mellitus.

Table 2 shows that the mean pre-test and post-test scores of CAHAI- 8 among intervention group had shown improvement from 22.23 ± 1.31 to 33.52 ± 3.97 and the mean difference was 11.3. The mean pre-test and post-test scores of CAHAI- 8 for patients in the control group was 22.07 ± 1.46 and 28.0 ± 3.95, with a mean difference of 5.93. This difference has been established statistically significant at a *p*-value of .018. Between the intervention group and control group, a statistically significant difference was also observed in the pre-test and post-test ARAT scores. The mean pre-test and post-test scores of ARAT score increased from 29.64 ± 2.17 to 42.25 ± 4.47 in the intervention group and that of the scores in the control group increased from 30.54 ± 2.05 to 37.33 ± 3.13 respectively (p=.013).

Table 3 illustrates that the mean difference in the pre – test and post – test scores of CAHAI 8 was 11.29 ± 3.4 in the intervention group, whereas it was only 5.93 ±3.3 in the control group. This difference was found to be statistically significant (p<.01). The mean difference in the pre–test and post–test scores of ARAT was 12.61 ± 3.0 in the intervention group and only 6.79 ± 1.9 in the control group which was found to be statistically significant (p<.01). The result showed that GRASP improved the functions of upper limb among stroke patients.

Discussion

The aim of this study was to find out the effect of GRASP on the upper limb function among stroke patients. The result showed an improvement in the function of the upper limb in patients after stroke. Findings of this study are similar to the observation in other studies using GRASP (Lee et al., 1999; Harris et al., 2009).

The limitation of our study was that the follow-up period was limited to one month and the study was limited to only those patients with ischemic stroke. This study has not investigated whether the effect of GRASP is persisting after discontinuing the programme. However, it is evident from the study by Harris et al., 2009 that the improvement in upper limb function is persisting at five months' post-stroke.

This study showed that GRASP is beneficial among Kerala population, where majority belong to low socio-economic and educational level.

Conclusion

Based on this study, it was concluded that GRASP significantly improves the upper limb function among patients with stroke. This study suggests the need for similar studies to be conducted to improve the functions of the upper limbs in these patients. This study throws light on the importance of training nurses in GRASP and other supportive therapies for establishing stroke rehabilitation clinic in the outpatient department, which improve the QoL of patients after stroke.

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