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ORIGINAL ARTICLE **OPEN ACCESS**

Effect of Verbal Feed Back and Visual Feed Back on Functional Out Come in Patients of Acute Hemiparetic Stroke: A Comparative Study

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ABSTRACT
Cerebrovascular accident refers to the vascular state of the brain. A difference in focal deficiency, altered degree of impairment & consciousness motor, sensory, cognitive, perceptual, and language activities. Rehabilitation in stroke patients seeks to minimize the neurological deficits and its complication and facilitate the social re-integration of the individual through maximized motor function and balance ability to perform ADL. Both visual and verbal feedback is expressed immediate for the most part throughout stroke rehabilitation. Patients' functional activities can be better by getting visual feedback during implementation. Auditory feedback on strength performance can improve the production of movement or locomotion. The motive of the research is to analyse the outcome of verbal feedback and visual feedback on functional outcomes in patients of Acute Hemiparetic CVA. 30 subjects were selected & conveniently divided into 2 groups of 15 subjects each. Group Apatients were treated with visual feedback training under supervision, by a Physiotherapist. Group B patients were treated with verbal feedback training under the supervision box of a Physiotherapist. All the groups were treated for 45 to 60 minutes per session for 8 weeks (5 sessions in a week). Modified Rankin Scale (MRS) and Functional Independence Measure (FIM) were used to assess the changes between pre and post-intervention of the two groups. Intra-group comparison of pre and post-treatment between the study groups. (N=30) shows the statistically significant variance in the study group with P value <0.05, Comparison of post-treatment outcomes between the two groups (N=30) showed statistically better improvements, but according to the statistical analysis VISUAL FIM had slightly better improvement as compared to VERBAL FIM with a p-value of 0.075,all the other have no statistically significant difference. It was concluded that a combination of Visual feedback, Verbal feedback & Conventional physiotherapy training program will be more effective in improving the Function, ADL and cognitive abilities of people living with stroke and also reduce the risk of secondary complications.
Keywords: *Stroke, Visual feedback training, Verbal feedback training, Conventional Physiotherapy Training, Functional Performance*

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INTRODUCTION

A stroke happens when the tissues of the brain get devoid of essential vital agents leading it into a mandated interventional state. Ischemic stroke is the most frequent type, about 80 % of individuals with CVA are affected when blood flow is blocked by a clot, stopping oxygen from reaching the brain. When blood loss occurs Hammeragic stroke is experienced, depriving the brain of required nutrients & oxygen. A hemorrhagic stroke happens when blood vessels burst; resulting in leakage of blood all over the brain [3]. CVA is a term used alternatively to depict blood-related conditions of the brain,used interchangeably with stroke to refer to the vascular conditions of the brain. The defective neurological nature of a minimum of twenty-four hours is needed to be implicated as stroke[1]. Motor losses are described by hemiplegia/hemiparesis along either side is evidenced by loss in motor function. CVA is organized by the causative classification (thrombosis or haemorrhage) & treatment grouping ischemic attack, minor & major CVA, and young & deteriorating stroke from the basis for intervention[1, 20].

CVA can cause hanging off one side of the face, loss of speech, weakness & paralysis of the arm, and a leg on one side of the body. 2/3rdpeople experience damaged vision, for instance, people do not recognize eating the entire food placed on their plate. There are many treatment approaches, which have been developed over the years for the improvement of functional activities after stroke [1, 2, 9]. Visual & Verbal feedback has been used to improve functional activities after stroke. Few research show that feedback may strengthen motor learning after CVA. However, there are so many areas as not yet been examined & no study has been done comparing visual and verbal feedback hence there is surely required for

considerable research in this region. So there is some justification for utilizing it in stroke rehabilitation [4]. Hence the need for this study.

MATERIAL AND METHODS

This was a Quasi-experimental study design. The study subject was acute hemiparetic stroke patients. The study setting and source of data were Patients in & around Bangalore and the Outpatient department of Krupanidhi College of Physiotherapy. The study was done on 30 subjects (Group A: 15 and Group B: 15). Study duration was 8 weeks study, 5 sessions in a week, with a convenient sampling method.

Subjects were recruited based on the clinically diagnosed cases of acute hemiparetic stroke, between the age group: 30 – 65 years. Patients were selected from both genders Male & female. Hemiparetic of either side (Right or Left) were included. Patients should have the ability to follow simple verbal instructions, and at least minimal voluntary control of the paretic limbs. Moderate stroke as defined by Functional independence measure. Subjects with involvement of MCA territory. A stroke of two weeks duration was required as the minimum criteria [5,6].

Patients with certain disorders or conditions were excluded from the study. Conditions like Sensorial aphasia, visual deficits, verbal deficits, cognitive deficit, non-co-operative patients, uncontrolled hypertension, dementia and other mental disorders [5,6].

Outcome Measures:

- Modified Rankin scale.
- Functional independence Measure

Procedure

Pre-intervention measurement: The patient underwent evaluation with the Modified Rankin scale & Functional Independence Measure. Two groups Group A, and Group B subjects were taken for pre-test assessment. Subjects from Group A patients were treated with visual feedback training under supervision by the physiotherapist. Group B patientswere treated with verbal feedback training under supervision by the physiotherapist. Both groups were treated for 45 to 60 minutes per session for 8 weeks. There were two treatment sessions in a day. Treatment sessions were 5 sessions in a week. The outcome and result were analysed.

Visual Feedback

Visual feedback is more important to people with CVA to learn new motor skills. Visual feedback is delivered intuitively most often throughout stroke rehabilitation. Visual feedback is effective in gaining a symmetrical stance following a stroke.Visual feedback training incorporated into functional physical therapy can improve stance symmetry in stroke patients. The visual feedback will be given by a videotape and demonstrated by a trainer under supervision by the physiotherapist. The patient asked to perform some activities. These activities were recorded by capturing videos, Audio was not included in these videos and shown to the patients of the visual group, Patients were asked to perform those activities as shown in the video similarly. The only difference being the number of repetitions is increased. Treatment session was 30 to 60 minutes twice a day and 5 days a week.

For Lower Extremities

In lying: Active ankle toe movements, active knee flexion and extension, knee isometrics exercises, ankle isometrics exercises, hip flexion, extension, abduction & adduction and pelvic bridging.

In sitting: Weight transference from side to side, lifting one leg at a time in sitting.

Fig 1. In Standing

In Standing: Weight bearing on the affected leg. Position the sound leg in the step, stepping out to the side with the affected leg, stepping up with the sound leg on the step, and putting the sound leg, further and further back. Releasing the knee and moving the affected leg.With feet close together stand and guide the pelvis forward and down to release the knee on the affected side. Instruct to straighten it again without pushing the whole leg side back.

Activities on the tilt board: Stride standing on the tilt board, step standing on the tilt board.

Activities on the mat: Kneel on the mat, kneel standing-transfer weight over affected leg-hip forward, Stepping forward with sound knee-affected hip stable, Side sitting from kneeling, Half kneel standing-tapping with the sound foot, Stand from kneeling.

Upper Extremities:

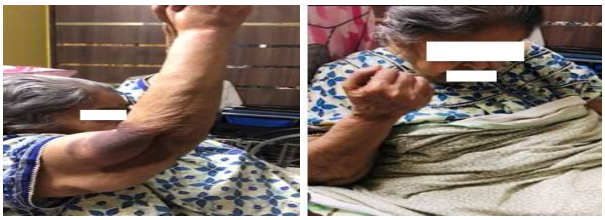

Fig 2. In Lying

In lying: Self-assisted arm exercise, making mini circles in the air with the elbow extended, moving the opposite shoulder and lifting it, Flexion & extension of the elbow, Holding a stick by both hands, then doing flexion and extension.

Fig 3. In Sitting

In sitting: Holding a big towel in the sound hand & makes circles, the hand moves without resistance, and Weight shifts through the arms behind and sideways.

In standing: while rotating the trunk weight bearing on the sound arm, hands flat on the wall & try to uplift the hand.

Other activities such as arriving forward**,** grasping and releasing objectsstepping up and stepping down&heel rise.

The treatment session will be 30 to 60 minutes twice a day and 5 days a week.

Verbal Feedback

The provision of verbal feedback provides a potential strategy for enhancing walking performance in patients with post-CVA Hemiparesis.Verbal feedback improves the performance of a sit-to-stand activity in post-stroke patients. Verbal feedback admires verbally by the trainer. Verbal feedback represents a compatible tool to increase patient motor production, participation and inspiration & functional presentation. The treatment was given for 30 to 60 minutes per session. The patient asked to perform some activities. Patients were given instructions verbally. The treatment session was 30 to 60 minutes twice a day and 5 days a week.

Post-intervention measurement:

The patient underwent again in evaluation with the Modified Rankin scale & Functional Independence Measure.

Statistical Analysis

Table 1: Age statistics for the study group

Age	Frequency	Percent	Valid Percent	Cumulative Percent
35	1	6.7	6.7	6.7
36	2	13.3	13.3	20.0
37	2	13.3	13.3	33.3
45	1	6.7	6.7	40.0
57	3	20.0	20.0	60.0
61	1	6.7	6.7	66.7
63	1	6.7	6.7	73.3
64	2	13.3	13.3	86.7
65	2	13.3	13.3	100.0
Total	15	100.0	100.0	

Table 1 (age) the table shows that the age group taken for the study matches the inclusion and exclusion criteria, the minimum age was 35 and the maximum age was 65.

Table 2: Gender Distribution for the study group

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	F	9	60.0	60.0	60.0
	M	6	40.0	40.0	100.0
	Total	15	100.0	100.0	

In our study, there were 6 males and 9 females (Table 2). This allows for a fare outcomes results.Among the study population, 9 (60%) were male and the remaining 6 (40%) were female.

Table 3: Agestatistics for the study group

Age		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30	1	6.7	6.7	6.7
	32	1	6.7	6.7	13.3
	39	1	6.7	6.7	20.0
	49	1	6.7	6.7	26.7
	51	1	6.7	6.7	33.3
	55	1	6.7	6.7	40.0
	59	2	13.3	13.3	53.3
	60	1	6.7	6.7	60.0
	61	2	13.3	13.3	73.3
	62	1	6.7	6.7	80.0
	64	1	6.7	6.7	86.7
	65	2	13.3	13.3	100.0
	Total	15	100.0	100.0	

According to table 3. (Age) the table shows that the age group taken for the study matches the inclusion and exclusion criteria. The minimum age was 30 and the maximum age was 65

Table 4: Gender Distribution for the study group

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	F	3	20.0	20.0	20.0
	M	12	80.0	80.0	100.0
	Total	15	100.0	100.0	

In our study, there were 12 males and 3 females. This allows for fair outcomesand results.Among the study population, 12 (80%) were male and the remaining 3 (20%) were female.

Table 5: Paired samples Mean Std Deviation and Std Error Mean

Paired samples		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PreTestVISMRS	4.27	15	.704	.182
	PostTestVISMRS	2.93	15	1.033	.267
Pair 2	PreTestVISFIM	2.53	15	.743	.192
	PostTestVISFIM	3.87	15	1.125	.291
Pair 3	PreTestVERMRS	4.27	15	.458	.118
	PostTestVERMRS	3.53	15	.640	.165
Pair 4	PreTestVERFIM	2.33	15	.488	.126
	PostTestVERFIM	3.07	15	.704	.182
Pair 5	PostTestVISMRS	2.93	15	1.033	.267
	PostTestVERMRS	3.53	15	.640	.165
Pair 6	PostTestVISFIM	3.87	15	1.125	.291
	PostTestVERFIM	3.07	15	.704	.182

Table 6: Paired samples correlations and significance

Paired Samples		N	Correlation	Sig.
Pair 1	Pre-Test VIS MRS & Post-Test VIS MRS	15	.812	.000
Pair 2	Pre Test VIS FIM & Post-Test VIS FIM	15	.860	.000
Pair 3	Pre-Test VER MRS & Post-Test VER MRS	15	.699	.004
Pair 4	Pre-Test VER FIM & Post-Test VER FIM	15	.763	.001
Pair 5	Post-Test VIS MRS & Post-Test VER MRS	15	-.267	.337
Pair 6	Post-Test VIS FIM & Post-Test VER FIM	15	-.529	.043

Table 7: Paired Samples t-test and significance

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-Test VISMRS-Post-Test VISMRS	1.333	.617	.159	.992	1.675	8.367	14	.000
Pair 2	Pre-Test VISFIM – Post-Test VISFIM	-1.333	.617	.159	-1.675	-.992	-8.367	14	.000
Pair 3	Pre-Test VERMRS– Post-Test VERMRS	.733	.458	.118	.480	.987	6.205	14	.000
Pair 4	Pre-Test VERFIM – Post-Test VERFIM	-.733	.458	.118	-.987	-.480	-6.205	14	.000
Pair 5	Post-Test VISMRS– Post-Test VERMRS	-.600	1.352	.349	-1.349	.149	-1.718	14	.108
Pair 6	Post-Test VISFIM – Post-Test VERFIM	.800	1.612	.416	-.093	1.693	1.922	14	.075

P value computed using Chi-square test

Statistically marked changes between the pre & post-visual MRS, visual FIM, verbal MRS, and verbal FIM at a p-value of (0.000) were observed.

Both the groups showed statistically better improvements, but according to the statistical analysis VISUAL FIM had slightly better improvement as compared to VERBAL FIM with a p-value of 0.075.

RESULTS

Thus, it can be stated that two Groups (Group A& Group B) were individually effective. Both the groups showed statistically better improvements, but according to the statistical analysis VISUAL FIM had slightly better improvement as compared to VERBAL FIM with a p-value of 0.075.

DISCUSSION

The research was done to identify the effect of verbal feedback and visual feedback on functional outcomes in patients with acute hemiparetic stroke. In this study the role of various sensory cues and the individual effect of various sensory modalities such as visual and verbal feedback and to compare and identify the most efficient form of feedback. The samples were collected from the convenient screening of patients with Middle Cerebral Artery lesions. Fifteen subjects were allotted in two each groups. The total duration of the study was for eight weeks (5 sessions in a week). The pre-test prior to the training and post-test after eight weeks were taken using MRS and FIM respectively.

Group A patients were given visual feedback training under supervision by a Physiotherapist. Group B patients were given verbal feedback training under supervision by a Physiotherapist. The data was collected by using the Functional Independence Measure scale and Modified Rankin scale.The analysis of data showed, there is a significant development in all 2 groups, of patients after treatment. When analysing the post-test scores of group A & group B, it was identified, there is a more significant development in group A than in group B.

The process of motor learning is enhanced by verbal feedback amidst the lack of other feedback ideas. The home program can be more efficient using less-cost auditory devices [15].

While comparing verbal physiotherapy & balance teaching with visual feedback there were non-similar effects which by practice can be boosted for motor calibre [5].

Their trial explored whether the initial provision of visual feedback of biomechanical motion exhibited throughout gait rehabilitation demonstrates improved strength outcomes after CVA & expandsthe patient's perception of their rehabilitation [9].

The study was done with both male and female subjects in all two groups and all the subjects were found to show a considerable improvement in functional performance. Group A showed better results than Group B. However, group A showed slightly better improvement than group B.In general, the two groups had an improvement in motor function and balance but from the investigation, it can be seen that there seems to be more progressive in patients of group A regardless of the training or duration of treatment.
The study was for a very short duration. A long duration may be needed to conclusively validate the results.The sample size may be too small for generalization. Hence the study can be expanded to a larger and more diverse population. This research was done with the age group from 30 - 65 years; other age groups were not examined. In practice, it is not always easy to control the cues from sensory stimulation and the isolation of sensory cues into visual and verbal forms will not be perfect.Sample bias cannot be avoided in all conditions. Extraneous variables like temperature, stress, and humidity, Cannot be controlled.A big sample size with a prolongation of follow-up time is recommended to make the study more reliable.In future, the duration of the study can be increased.Further studies can be done including other physiotherapy treatment modalities and exercises.

CONCLUSION

The rehabilitation of CVA is a complicated & confusing procedure. There has been substantial research on the use of sensory information to manage Stroke patients. Several therapeutic measures can be initiated using various sensory cues. The use of Visual and Verbal cues has been an important part of CVA rehabilitation, but still, there is a lot of supportive study for the efficacy of either one of these approaches in the rehabilitation of Stroke patients, there are nearly very some studies which was able to identify the more effective form of feedback.
This research is useful to identify a mode of feedback that is highly effective. From the investigation of data, it can be concluded that although visual feedback & verbal feedback are essential, the regaining of function after Stroke by Visual feedback seems to offer a better procedure of recovery and therefore it can be used frequently in combination with Visual feedback, Verbal feedback & Conventional physiotherapy training program will be more effective in improving motor function, balance, ADL and cognitive abilities of people living with stroke and also reduced the risk of secondary complications.

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