

Concept of Hand-In-Hand Therapy Approach on Functional Outcome and Psychological Status in Stroke Survivors

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ABSTRACT

Background cerebrovascular accident [CVA]) is the sudden loss of neurological function caused by an interruption of the blood flow to the brain. ^[1] CVA also referred to as stroke is the third cause of death in the world.

Objective: To evaluate and study the concept of Hand in Hand therapy Approach on functional outcome and psychological status in stroke survivors.

Methods: Ethical clearance was obtained from Institutional Ethical Committee, KIMSDU, Karad. 35 subjects were selected and were divided into two groups. Group A: Conventional program with Functional training and Recreational activity without caregiver Group B: Conventional program with Functional training and Recreational activity with Caregiver.

Results: Statistical test was performed using paired test and unpaired test. Functional Independence Measure Scale -Post training between Group A and Group B following results were seen extremely significance(p value 0.0001) Patient health questioner 2- Post training between Group A and Group B following results were seen extremely significance(p value 0.0001) Patient health questioner 9 Post training between Group A and Group B following results were seen extremely significance(p value 0.0001) Perceived stress scale 10 Post training between Group A and Group B following results were seen extremely significance(p value 0.0001) .

Conclusion: The present study concluded that there is a significant effect of Concept of hand-in-hand therapy approach on functional outcome and psychological status in stroke survivors

Keywords: Stroke, Post stroke depression, Functional Independence Measure Scale, Patient Health Questioner 2 and 9, Perceived Stressed Scale 10.

INTRODUCTION

Definition

Cerebrovascular accident [CVA]) is the sudden loss of neurological function caused by an interruption of the blood flow to the brain. ^[1] CVA also referred to as stroke is the third cause of death in the world. Stroke is Sudden loss of neurological function caused by an interruption of the blood flow to brain. ^[2] Ischemic stroke is

the most common type, affecting 80% of individuals with stroke, and results when a clot blocks or impairs blood flow, depriving the brain of essential oxygen and nutrients. Haemorrhagic stroke Occurs when blood vessels rupture, causing leakage of blood in or around the brain. The term CVA is used interchangeably with stroke to refer to vascular condition of the brain. Clinically variety of focal deficits are possible

including changes in level of consciousness and impairment of sensory, motor, cognitive, perceptual, and language functions. To be classified as stroke, neurological deficit must persist for at least 24 hours. [3]

Prevalence

The estimated average prevalence rate of stroke range 84-262/100,000 in rural and 334-424/100,000 in urban areas. The incidence rate is 119-145/100,000. [4]

Sign and Symptoms

Motor deficits are characterized by paralysis (hemiplegia) or weakness (hemiparesis) typically in the side of the body opposite the side of the lesion. The term plegia often used generically to refer to the wide variety of motor problems that results from stroke. [5]. It is the leading cause of long-term disability; survivors generally live one to eight years after the stroke and most experience varying degrees of chronic disabilities that limit their cognitive and functional abilities, affecting daily life activities (DLA) [3] stroke may demonstrate **pseudo bulbar affect (PBA)** also known as Emotional lability or emotional dysregulation syndrome. PBA occurs in about 18% of cases and is characterized by emotional outburst of uncontrolled or exaggerated laughing or crying that are inconsistent with mood. The patient quickly changes from laughing to crying with only slight provocation. The patient is typically unable to control these episodes or to inhibit the expression of spontaneous emotions. Frequent crying may also accompany depression. [3] **Apathy** occurs in about 22% of cases and is characterized by a shallow affect and blunted emotional responses. In such patients apathy is frequently misconstrued as depression or poor motivation. Patient can also demonstrate euphoria (exaggerated feeling of well-being), increased levels of irritability or frustration, and social inappropriateness. Increased level of irritability and frustration are natural outcome of high stress levels. These

behaviour along with poor social perception of oneself and environment may lead to increasing isolation and social withdrawal. [3]

Post stroke depression: Depression is extremely common occurring in about one third of stroke cases. It is characterized by persistent feeling of sadness accompanied by feeling of hopelessness, worthlessness, or helplessness. [5]

The period from 6 months to 2 years after CVA is most likely time for depression to occur. [5] It occurs in both mildly and severely involved patients. These findings suggest that post stroke depression is not simply result of psychological reaction to disability but rather a direct impairment of CVA. Prolonged post stroke depression can interfere with success of rehabilitation and result in long term functional outcome. American Stroke Association has done Screening test for post stroke depression were they showed it as “mood disorder due to a general medical condition (i.e. stroke)”. Major depression occurs in up to 25% of patients. [6] Minor depression occurs in up to 30% of patients following stroke. It is considered the most frequent and important neuropsychiatric consequence of stroke. [6] At 6 months, a majority of patients with PSD continued to have symptoms. Post-stroke depression is highly prevalent among both men and women. [7]

Mechanism- A primary biological mechanism with stroke affects neural circuits involved in mood regulation which in turn causes post-stroke depression also caused by social and psychological stressors Difficulty concentrating, remembering, making decisions, Irritability are also important to be considered during Rehabilitation program. [5]

Risk Factors

The risk factors for stroke is development of atherosclerosis, major risk factor are hypertension, heart disease (HD), disorders of heart rhythm, and diabetes mellitus (DM), 30% peripheral arterial disease (PAD), increased with elevated total

blood cholesterol(*hypercholesterolemia*). *Modifiable risk factors* are cigarette smoking, lack of exercises, obesity, and diet, sedentary life style.^[3]

Warning Signs

Warning signs of stroke are sudden numbness or weakness of the face, arm or leg, especially on one side of the body, sudden confusion, disturbed sleep or understanding, sudden difficulty in seeing in one or both eyes, sudden severe headache with unknown cause sudden difficulty in walking, dizziness, loss of balance or coordination.^[3]

Physiotherapy Intervention

The physiotherapy intervention that is exercise is to improve mobility, increase functional independence, relieve pain, and minimise limitations due to permanent disabilities. CVA is a chronic condition, we have to spend the more time of rehabilitation, from the early stage that is inpatient in the acute care hospitals physiotherapy intervention are the primary mechanism by which functional recovery, mobility and functional independence of patient are achieved in stroke.^[8]

Conventional Exercises:

Conventional exercises Program are exercises that are traditionally practiced since ancient times and are accepted worldwide. Conventional training for CVA or stroke survivors include relaxed passive movement, sustained stretching, active assisted RIMP to both the limbs, bed mobility exercises, Gait training. These exercises can also be performed with the help of various modifications and may help to achieve a faster recovery at least to improve the patient's functional performance.^[9]

If therapist will consider the additional factor in training program and use a efficient resource which will be cost-effective and may be beneficial component in the Rehabilitation program. Several systematic reviews have shown that a higher intensity of training can lead to better functional outcome after stroke.^[10] Currently the resources for patient settings

are not always sufficient and innovative methods are necessary to meet these recommendations without increasing health care costs.^[10] A resource efficient method to augment the compliance of patients could be to involve caregivers in exercise training. The caregiver remains in contact with the primary health care provider, often a doctor or nurse, and helps the patient receiving care make decisions about their health and matters affecting their daily life.^[11] They are more actively involved in the rehabilitation process with the health professionals. The patient required long process of rehabilitation to improve their functional ability and health related quality of life. During these processes, the patients and caregivers show lack of motivation and hopes while rehabilitation. One study concluded that there is very low to moderate quality evidence that caregiver mediated exercise may be valuable intervention to augment the therapeutic option for stroke rehabilitation.^[12] Future research should determine whether CME interventions are cost effective.^[11] Other studies showed that A Home based exercise program with regular support from a physiotherapist and caregiver are key elements facilitating continuing program adherence in people with AD.^[13] It is important to maintain their adherence throughout rehabilitation process which is ultimately related to the betterment of the patient. Thus it is essential to determine the consistency of the patient during their rehabilitation program and also determining their functional activity level and psychological status.

MATERIALS AND METHODS

A total 35 participants with history of stroke willing to take treatment for 8 weeks were recruited for the study. The subjects were screened before commence of treatment and were put in either of the groups Group A received conventional treatment with Functional training and Recreational activity without caregiver and Group B received conventional treatment with Functional training and Recreational

activity with Caregiver by consecutive random sampling method. A written informed consent was taken from each participant. Ethical Clearance was obtained from University's Institutional Review Board. Inclusion criteria were both male and female subjects between 25-65 years of age, Brunnstrom stage 3 and 4, caregiver should be the family member of patient, both male and female caregiver.

PROCEDURE

This was a comparative study of Concept of hand-in-hand therapy approach on functional outcome and psychological status in stroke survivors which was done in clinically diagnosed post stroke hemiplegic patients.

The patients were selected according to the inclusion and exclusion criteria. Informed consent was taken from the patient and patient's caretaker. Subjects were assessed for functional independence measure, PHQ2 PHQ9, Perceived Stress Scale 10, prior intervening the exercise protocol. Subject was explained about the procedure of the study. subjects were divided into two different groups. Group A received conventional training exercise along with functional training and recreational activity and Group B was experimental group also received Conventional training exercises along with functional training and recreational activity with caregivers regularly for 8 weeks. After 8 weeks the post treatment assessment for functional independence was taken with the help of assessment tools (Functional Independence Measure, PHQ 2 PHQ 9, Perceived Stress Scale,)Pre and post treatment scores of functional mobility of both the groups were taken for statistical analysis.

- Within the groups the data was analysed by **paired t** test.
- Between the groups the data was analysed by **unpaired t** test
- The p and t values were calculated.

Concept of hand-in-hand therapy approach on functional outcome and psychological status in stroke survivors was analyzed.

EXERCISE PROTOCOL:

- **Conventional Exercises** : 5 days/8 weeks regularly

1. Passive RIMP (Reflex Inhibitory Movement Pattern) for Upper limb and Lower limb

Patient position- Supine lying

Passive movements of upper limb and lower limb was given:-

(30 repetitions×3 sets)

Upper limb

- 1) Shoulder flexion-extension
- 2) Shoulder adduction- abduction
- 3) Elbow flexion- extension
- 4) Forearm supination-pronation
- 5) Wrist flexion-extension
- 6) Weight bearing
- 7) Reach outs

Lower limb

- 1) Hip flexion-extension
- 2) Hip adduction-abduction
- 3) Knee flexion-extension
- 4) Ankle dorsiflexion –plantar flexion
- 5) Gait training

Functional training

Dressing upper body

Dressing lower body

Getting in and out of vehicle

Recreational activity

Drawing

Greeting cards

Therapeutic clay crafts

Day 1 – Conventional program + Functional training

Day 2 – Conventional program + Recreational activity

Day 3 – Conventional program

Day 4 – Conventional program + Functional training

Day 5 – Conventional program + Recreational activity

Group A: Conventional program + Functional training + Recreational activity

Group B: Hand in Hand Therapy

Conventional program + Functional training + Recreational activity with

Caregiver

STATISTICAL ANALYSIS:

The statistical analysis was done using paired 't' test and unpaired 't' test.

- Paired 't' test was used for statistical analysis of pre and post intervention within group.

- Unpaired 't' test was used for between group statistical analysis of Group A and Group B.

RESULTS AND INTERPRETATIONS

FIMS

Table no. 1 Pre and Post interventional intragroup analysis –FI MS

Group	Group A	Group B	t value	p value	Significance
Pre training Mean	4.23	4.25	0.042	0.966	NS
Post training Mean	4.47	5.5	4.361	0.0001	ES

PHQ 2

Table no. 2 Post interventional intragroup analysis – PHQ 2

Group	Group A	Group B	t value	p value	Significance
Pre training Mean	4.76	4.81	0.182	0.9066	NS
Post training Mean	4.23	2.12	8.228	< 0.0001	ES

PHQ 9

Table no. 3 Post interventional intragroup analysis – PHQ 9

Group	Group A	Group B	t value	p value	Significance
Pre training Mean	17.47	17.56	0.118	0.966	NS
Post training Mean	14.05	8.56	4.874	<0.0001	ES

PSS 10

Table no. 4 Post interventional intragroup analysis – PSS 10

Group	Group A	Group B	t value	p value	Significance
Pre training Mean	33	33.31	0.251	0.8026	NS
Post training Mean	28.05	13.93	8.532	<0.0001	ES

With functional independence measure scale, p value 0.001 shows that there was significant difference in the post treatment scores, of group A and group B.

With patient health questioner 2 and 9, p value less than 0.001 shows that there was significant difference in the post treatment scores, of group A and group B.

With perceived stress scale 10 scale, p value less than 0.001 shows that there was significant difference in the post treatment scores, of group A and group B.

Concept of hand-in-hand therapy approach i.e. involving caregivers is effective in improving the functional independence and psychological status in stroke survivors. Comparative to conventional group, experimental group intervention is more effective.

Within the Group Comparison:

1. Functional Independence Measure Scale -

Pre- Post training following results were seen :

Group A : p value =0.2156

Group B : p value =0.0002

2. Patient health questioner 2 -

Pre- Post training following results were seen :

Group A : p value =0.0030

Group B: p value =< 0.0001

3. Patient health questioner 9 -

Pre- Post training following results were seen :

Group A : p value =< 0.0001

Group B: p value =< 0.0001

4. Patient health questioner 2 -

Pre- Post training following results were seen :

Group A : p value =< 0.0001

Group B: p value =< 0.0001

Between the Group Comparison:

1. Functional Independence Measure Scale -

Post training between Group A and Group B following results were seen:

p value 0.0001

2. Patient health questioner 2-

Post training between Group A and Group B following results were seen:

p value <0.0001

3. Patient health questioner 9

Post training between Group A and Group B following results were seen:

p value <0.0001

4. Perceived stress scale 10

Post training between Group A and Group B following results were seen:

p value <0.0001

DISCUSSION

The study Concept of hand-in-hand therapy approach on functional outcome and psychological status in stroke survivors was conducted to compare the two groups to find out its effects on functional independence and psychological state. The participants were taken continuously 8 weak physiotherapy intervention.

The objectives of the study are to find out the effect of hand-in-hand therapy approach i.e. involvement of caregivers on functional independence and psychological status comparing with conventional group.

The study was conducted on 35 subjects. Pre consent was taken from them. They were divided into two group with 18 was in group A that is conventional and 17 was in group B that is experimental group. Interventions were carried out for 5 days a week for 8 weeks regularly. This study mostly focused on the functional independence and motivation of the individuals and the best possible treatment for it so, the outcome measures for this study were Functional Independence Measure, Patient Health Questioner 2 and 9, Perceived stress scale 10. The subjects were analysed for Functional Independence and psychological status.

The loss of motor function because of stroke is due to cell death in the infarcted area. The function of brain regions, including the contralateral areas that are connected to the areas of tissue damage, is compromised because hypo metabolism, neurovascular uncoupling, and disrupted neurotransmission, jointly called diaschisis. Some recovery of function occurs spontaneously after stroke. It is believed that this functional recovery involves, to some extent overlapping, and following phases: (a) reversal of diaschisis, activation of cell genesis, and repair; (b) changing the properties of existing neuronal pathway; and (c) neuroanatomical plasticity leading to the formation of new neuronal connection. The basic process underlying phases 2 and 3 also involved in normal learning and it has been recognised that functional improvement after brain injury is a relearning process. ^[14] Neuroanatomical plasticity leading to the formation of new neuronal connections.

The patient with stroke may demonstrate pseudo bulbar affect (PBA) also known as emotional lability or emotional dysregulation syndrome. PBA occurs in about 18% of cases and is characterized by emotional outburst of uncontrolled or exaggerated laughing or crying that are inconsistent with mood. The patient quickly changes from laughing to crying with only slight provocation. The patient is typically unable to control these episodes or to inhibit the expression of spontaneous emotions. Frequent crying may also accompany depression.

Depression is extremely common occurring in about one third of stroke cases. These findings suggest that post stroke depression is not simply result of psychological reaction to disability but rather a direct impairment of CVA. Prolonged post stroke depression can interfere with success of rehabilitation and result in long term functional outcome. . American Stroke Association has done Screening test for post stroke depression were they showed it as “mood disorder due to a general medical condition (i.e. stroke)”.

Major depression occurs in up to 25% of patients. Minor depression occurs in up to 30% of patients following stroke. It is considered the most frequent and important neuropsychiatric consequence of stroke. Approximately one-third of stroke survivors experience major depression. About 40% of those with PSD will develop symptoms within 3 months. 30% of non-depressed patients become depressed upon discharge from the hospital. At 6 months, a majority of patients with PSD continued to have symptoms. Post-stroke depression is highly prevalent among both men and women.

Physiotherapy intervention is to minimize the effects of the brain cell damage and optimize re-learning. It is well recognized that for cortical re-organisation to occur post stroke, there is a requirement for high levels of repetition of tasks and exercises that are both challenging and engaging. [15]

Conventional Exercises with patient's following stroke may be a stimulus for making new more effective functional connections within remaining brain tissue. Repetitive exercises appear to be major factors in promoting synaptogenesis and are important in rehabilitation of motor weakness following stroke.

Stroke severity is considered the most powerful prognostic factor because disability is a consequence of the severity of neurological impairment.

There is paucity of studies with consideration of psychological state of patient in conventional rehabilitation program. A previous study has been done to study the effect on functional mobility, gait parameters, ADL, balance etc. Studies shown involvement of caregivers with home based exercise program, e-health support, caregiver burden. Very few studies has conducted on these area so this study mainly aimed to study the involvement of caregivers in rehabilitation program in the outpatient department and comparing the effect with conventional exercise program.

Definitely a therapist plays an important role to keep patient motivated but

it is not always possible for a therapist to be with the patient continually. A family member is a person who consistently will be in a contact with patient and plays a supporting role in rehabilitation process. As stroke is a sudden squeal happened in individuals' life it is difficult for patient and family member to cope up with the sudden changes in terms of disability that patient faced a burden faced by family member. A patient is closely related to a family member so a additional support and continuous motivation from their side may add a therapeutic value in rehabilitation program.

In the present study considering the important component of rehabilitation i.e. conventional exercise program is added in the exercise protocol and with addition to these participants has been given functional training and a recreational activity with caregivers.

Thus the results of this study imply that Group B intervention i.e. along with caregivers is more effective treatment option as compared to Group A. It is due to the feeling of constant support and motivation from the caregiver.

The improvement can be explained possibly due to fact of repetitive exercises including functional training program with caregivers improves cortical reorganization to occur with high level of stimulus for making new more effective functional connection pathways within remaining brain tissues.

Repetitive exercises appear to be major factor in promoting the functional independence with psychological support from the caregiver in stroke rehabilitation.

For caregiver in terms of advantage of exercises is a need for every individual from adulthood till elderly. This is a good resource for home exercise program. A caregiver was understood the psychological state of patient and also the patient understand their important role and efforts took by the caregiver.

This study shows that both the group showed significant improvement in the outcome variables concluding that it

improves functional independence, depression and stress level. This was confirmed using statistical analysis by using 'Paired t-test' for within group comparison and 'Unpaired t-test' for between the group comparisons.

CONCLUSION

It is concluded that Concept of hand-in-hand therapy approach on functional outcome and psychological status in stroke survivors is effective in improving the functional independence and psychological state in the stroke survivors.

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