EFFECTIVENESS OF CO-OP APPROACH IN IMPROVING ADL PERFORMANCE IN PATIENTS WITH STROKE

DISSERTATION SUBMITTED
FOR
MASTER OF OCCUPATIONAL THERAPY
2016 – 2018

KMCH COLLEGE OF OCCUPATIONAL THERAPY

AFFILIATED TO THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI

CERTIFICATE

This is to certify that the research work entitled "EFFECTIVENESS OF CO-OP APPROACH IN IMPROVING ADL PERFORMANCE IN PATIENTS WITH STROKE"was carried out by Reg.No.411614001, KMCH College of OccupationalTherapy, towards partial fulfillment of the requirements of Master of OccupationalTherapy (Advanced OT in Neurology) of the Tamil Nadu Dr. M.G.R. MedicalUniversity, Chennai.

Project guide
Mrs. Sugi .S. M.O.T.(Paeds),
Professor,
KMCH College of Occupational Therapy

Principal
Mrs.Sujata Missal, M.Sc. (OT), PGDR (OT),
KMCH College of Occupational Therapy

Clinical Guide
Dr. Arul Selvan. V, MD., DM (Neuro)., MRCP (UK)
FRCP(LONDON)., FRCP(EDIN)
Consultant Neurologist
Kovai Medical Center and Hospital, Coimbatore

DATE OF SUBMISSION: _____

Internal Examiner

External Examiner

ACKNOWLEDGEMENT

First and foremost I thank **God Almighty** for his unconditional love and for giving me the wisdom to accomplish this project and bring it to a successful culmination.

I would like to thank **my family and my sister** for being a constant source of encouragement and support through their powerful prayers throughout my study.

I would like to extend my heartfelt gratitude to my Guide, **Mrs. Sugi Sowmiyan**, **M.O.T. in Advanced Pediatrics** for supporting and giving me valuable suggestions for my thesis.

I am extremely thankful to **Mrs. Sujatha Missal, Principal, KMCH college of Occupational Therapy**, for her incredible support, constant encouragement and patient teaching.

I am thankful to **Mr. S. G. Praveen MOT, Vice Principal**, for his support markedly by raising questions regarding my study so that I could continue without hardship later.

I am very much thankful to **Dr. ARUL SELVAN.V, Consultant Neurologist** for his incredible support, and also for gving me his valuable time and suggestions.

I would like to mention my friends **Sakthi, Merin Franklin, Dinesh**, **Bhuvanesh** who were with me in all my ups and downs and supported me throughout my thesis, as we supported each other.

Special thanks to **my friends Rhema, Nivedha, Agnus, Anu, Ida, Tharani and Shuba akka** and all my seniors and juniors who supported me with their prayers.

My heartfelt gratitude to all the patients and care takers who participated and cooperated in my study without them the thesis would not be possible.

Thank you each and every one!

CONTENTS

ABSTRACT

AIM:

To investigate the effectiveness of COOP approach in improving the ADL performance in patients with impairments after stroke.

Methods

This study was done to find the effectiveness of CO-OP approach in improving the ADL performance in stroke patients and for this purpose 16 stroke patients were assigned according to convenience into the experimental and control group. There were with 5 men and 3 women in the experimental group and 4 men and 4 women in control group. FIM scale was used to measure the ADL skills, COPM was used to measure the performance and satisfaction in patients, PQRS was used to measure the quality of performance and Fugyl Meyer was used easure the motor performance.

Results

All the parameters of the experimental group increased significantly after the coop intervention (FIM self-care Z= -2.552 $p < 0.05$; FIM total Z= - 2.521, $p < 0.05$; COPM performance Z= -2.524, $p < 0.05$; COPM satisfaction Z= -2.521,$p < 0.05$; PQRS Z= -2.55, $p<0.05$; Fugyl Meyer UE Z= -2.375 $p<0.05$; Fugyl Meyer total Z = -2.375,$p< 0.05$) except Fugyl Meyer LE Z= -1.841 $p> 0.05$ and also all the parameters of control group also improved significantly after the regular ADL intervention (FIM self-care Z= -2.524 $p < 0.05$; FIM total Z= - 2.530, $p <0.05$; COPM performance Z= -2.521, $p < 0.05$; COPM satisfaction Z= -2.521,$p <0.05$; PQRS Z= -2.536, $p<0.05$; Fugyl Meyer UE Z= -2.201 $p<0.05$; Fugyl Meyer total Z = -2.214 ,$p< 0.05$) except Fugyl meyer LE (Z= -1.342 $p> 0.05$) .

Conclusion

Although both the groups improved significant CO-OP group should slightly better performance when compared to the control group.

INTRODUCTION

The WHO defines stroke as an "acute neurological dysfunction of vascular origin with symptoms and signs corresponding to the involvement of focal areas of the brain" [1]

Stroke is one of the leading causes of death and disability in India. A study conducted in 2013 showed the estimated prevalence rate of stroke range in India is 84-262/100,000 in rural and 334-424/ 100,000 in urban areas. The incidence rate is 119-145/100,000 considering the recent population based studies[2]

A large percentage of stroke survivors have significant disabilities. Stroke involves a variety of clinical deficits such as the impairments of motor, sensory, perception, attention, cognition, and language. These defects affect the performance of daily functional activities. [3, 4]

Two-thirds of stroke survivors experience upper-extremity (UE) impairment which can lead to difficulty performing meaningful occupations.[5] This reports participation restriction and about half remain dependent in Activities of Daily Living (ADL) after stroke. [6]

ADL refers to activities that are the fundamental elements that are required to live in a social world, they enable the basic survival and the well-being[25].ADL includes self-care tasks of eating, grooming, dressing, bathing and toileting. Mobility, communication, communication are also frequently added in this category.[26]

The purpose of an ADL training program is to make the patient to optimally perform, within the limit of his disabilities; all activities inherit to his daily life.[9]

The role of an occupational therapist with respect to ADL is to assist in identifying the importance of performing these tasks independently considering the person's home situations and the occupational roles and to base intervention on this information. [26]

Even after inpatient rehabilitation, most people do not achieve their functional goals following stroke. To overcome this limitation, the studies suggest that a new intervention paradigm must be found.[6]

The focus in present decade is shifted from traditional component-focused rehabilitation to more comprehensive, holistic approaches that maintain therapeutic gains and also support the generalization and transfer of skills for long term outcomes. To address this need a goal oriented cognitive approach, COOP was developed to overcome the ADL deficits.[6]

CO–OP is an individualized "client-centered, performance-based, problem-solving approach that enables skill acquisition through a process of guided discovery and strategy use". It is associated with changes in occupational performance, increase in motor, cognitive, psychosocial abilities, and motivation. It is based on contemporary theories of learning, including cognitive, behavioral, and cognitive–behavioral paradigms. [3, 4]

The main focus of the CO-OP approach is to teach patient to apply the acquired skills in various environments, and allow transfer to different occupations. [4]

CO–OP starts with the client being taught a global problem-solving strategy, "Goal–Plan–Do–Check," which is used throughout the intervention as a framework to support the Acquisition of the chosen skills. The therapist guides the discovery of Domain-specific strategies (e.g., altering body position and modifying the task) that is necessary to support performance. Underpinning the identification of strategies is a process referred to as dynamic performance analysis (DPA), which is used iteratively to identify the specific performance problems requiring strategies. [3]

CO-OP differs from other contemporary stroke rehabilitation approaches in that it combines theory and evidence from both motor and cognitive sciences and situates them in a client-centered framework. Also, in the other approaches the therapist does the analysis of performance breakdowns, develops performance strategies, and explicitly teaches the patient how to use those performance strategies.[10] Another limitation noted in other approaches using only task specific training is that generalization to other situations and transfer to other tasks, are generally not

demonstrated, and improvements gained in therapy are not consistently maintained once therapy stops. In CO-OP, retention, generalization and transfer have consistently been reported.[10]

CO-OP was originally developed for children with DCD, later on studies were done on other populations and proved the effect of CO-OP in conditions such as acquired brain injuries. The results obtained from these studies provide support for CO–OP's potential utility in treating conditions with more diverse performance deficits, such as stroke.[3]

Previous researches provide the evidence for CO-OP's capacity in improve occupational performance in adults with stroke[5]. However, they emphasized on all the occupational performance components using COPM which is client-rated. Hence the present study emphasize on the self-care as the primary outcome using FIM scale.

NEED FOR THE STUDY

- There are no studies done using CO-OP for stroke patients in Indian population
- Previous studies done had considered all occupational performance components, which leaves self-care less emphasized.
- The primary outcome measure used in previous researches was COPM which is completely client rated.
- Studies done previously stated that even after the in-patient rehabilitation, most patients do not achieve their functional following stroke. To overcome this limitation they suggested that a new intervention that is more holistic, comprehensive and which can maintain therapeutic gains for long term outcomes to be found.[6]

RESEARCH QUESTION

Will COOP approach be effective in improving ADL performance in patients with severe stroke impairments?

AIM AND OBJECTIVES

AIM:

To investigate the effectiveness of COOP approach in improving the ADL performance in patients with impairments after stroke.

OBJECTIVE:

- To determine the effectiveness of COOP approach in improving the ADL performance in individuals after stroke.
- To determine the effectiveness of other contemporary training methods in improving the ADL performance in patients after stroke.
- To compare the effectiveness of COOP approach over the other contemporary ADL training methods in improving the ADL performance in patients after stroke.
- To determine the effectiveness of COOP approach in improving the motor performance of the client.

HYPOTHESES

NULL HYPOTHESIS:

CO-OP is not an effective treatment approach in improving ADL in patients with stroke.

ALTERNATE HYPOTHESIS:

CO-OP is an effective treatment approach in improving ADL in patients with stroke.

OPERATIONAL DEFINITION

EFFECTIVENESS:

It is the degree to which the desired goal is achieved. In this study effectiveness is measured y degree to which ADL has improved after CO-OP intervention.

CO-OP:

It is a client centered cognitive based intervention which focuses on functional goals. It involves the client to plan, set goals, and brings out problem solving strategies by self.

OTHER CONTEMPORARY APPROACHES:

It refers to the interventions that are commonly in OT practice for ADL training among stroke patients, such as MRP and task oriented approach. Though task oriented approach is also client centered, where goal setting is based on the clients felt needs the planning and implementation of strategies are therapist driven.

RELATED LITERATURE

COGNITIVE ORIENTATION TO DAILY OCCUPATIONAL PERFORMANCE (CO-OP)[9]

CO–OP is an individualized "client-centered, performance-based, problem-solving approach that enables skill acquisition through a process of guided discovery and strategy use". Cognitive Orientation to daily Occupational Performance (COOP) is an approach that uses cognition to drive performance. Initially it was created for use with children who have occupational performance deficits, the CO-OP approach can be used for promoting the acquisition of new skills and the improvement of existing skills.

Verbal self-instruction and using the global problem solving strategy developed by Meichenbaum in his cognitive behavioral approach was adopted as a cornerstone for the this approach.

CO-OP was under development since 1991. Initially it was called Verbal Self-Guidance (VSG) which stressed the verbal guidance aspect of the approach. Later on Mandich showed that verbal self-guidance was only one of the features of this approach and that there were many additional cognitive strategies used throughout the therapy. To give importance on the cognitive strategies, the name was changed to CO-OP.

Objectives

CO-OP has three basic objectives:

- Skill acquisition: the client learns to perform the required or desired skills.In CO-OP, a client-centred approach is used to identify the skills to be acquired. The Canadian Occupational Performance Measure (COPM) is used with the client to identify the three skills that he/she needs to, wants to, or is expected to do at work, home, or leisure that will be the focus of treatment. The COPM is a self-reported measure that allows children to rate both their level of performance and their satisfaction while carrying out tasks that they need to do on a regular basis.

- Cognitive strategy development: the client learns to use a global problem solving strategy to frame the discovery of domain specific strategies that will solve performance problems and thereby, improve performance and promote learning of the skill.
- Generalization and transfer: the client uses the newly acquired skills and strategies beyond the treatment session, in everyday life, and these skills and strategies serve as a foundation for learning related skills and strategies.

Prerequisites:

For the CO-OP approach to be successful, there are a number of prerequisites for all involved: the child, his/her parents and/or caregivers and the therapist.

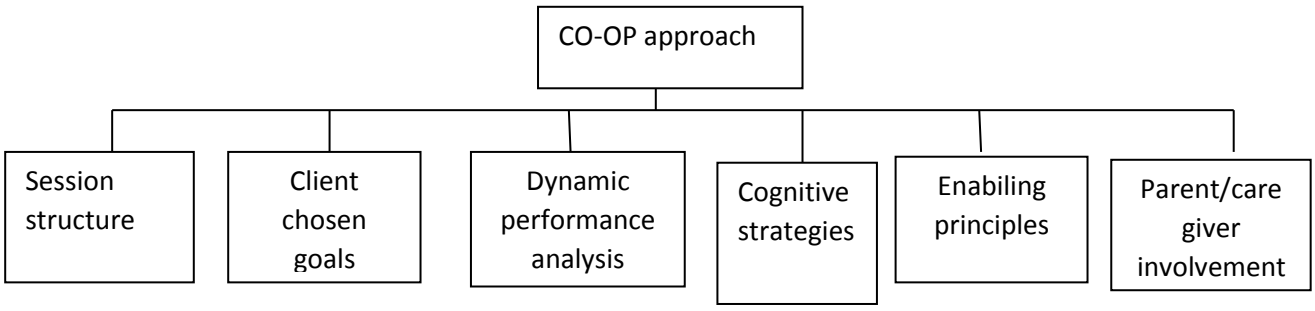
To benefit from the CO-OP approach, the client must:

- have adequate cognitive and language ability to respond to the COPM;
- be able to identify at least three occupational goals;
- be able to respond and also attend to the therapist;
- have enough potential to perform the task; and
- have the motivation to learn the skills.

To be able to use the CO-OP approach, the therapist must already bring with him or her effective communication skills, experience with the management of clients with disabilities in a client-centered framework, excellent skills in task analysis, and a commitment to working with caregivers also. In addition, the therapist must become proficient in the CO-OP approach.

Key features of the co-op approach:

The six key features of the CO-OP approach are session structure, child-chosen goals, dynamic performance analysis, cognitive strategies, enabling principles and parent/caregiver involvement.



- Session Structure: In Cognitive Orientation to daily Occupational Performance (COOP) the therapy is offered in a structured format. CO-OP is usually delivered over twelve, one-to-one sessions, each of about one hour in length. Parents and/or caregivers are encouraged to observe in order to encourage generalization and transfer. The therapy process is divided into five phases: Preparation, Assessment, Introduction, Acquisition and Consolidation.
- Client-Chosen Goals: CO-OP is a client-centered approach. The client's perspective is of main importance throughout, beginning with the process of goal setting and throughout the intervention. Finally having client choose their own goals ensures ecological relevance, which promotes motivation, transfer and generalization. A daily activity log is provided to the client in advance of the goal-setting session. The log helps them to reflect upon the activities that they do each day. At the beginning of the assessment phase, the COPM is used to ensure that the goals that will be focused on during intervention are client-chosen.
- Dynamic Performance Analysis: The third key feature of CO-OP is dynamic performance analysis (DPA), it is an iterative process of performance analysis, as it happens. DPA was developed in collaborating with the CO-OP approach to allow for continuous evaluation of performance and to develop the problem solving process. DPA begins during the first session and continues throughout the intervention program. The purpose of DPA is to solve performance problems by

identifying where performance breaks down, identifying possible solutions and testing them out in a trial and error method.

- Dynamic performance analysis (DPA) is based on three assumptions regarding occupational performance: that motivation is a necessary prerequisite for successful performance; that an individual requires adequate knowledge of a task before he or she can successfully perform the task and that occupational performance is the result of the interaction of person, occupation, and environment.

Cognitive Strategies

Cognitive strategies are cognitive operations that are a natural consequence of carrying out a task. They are strategic thinking processes aimed to achieve goals. In CO-OP, two types of strategies are used: a global strategy and domain-specific strategies. A global strategy is a general strategy that focuses on increasing metacognitive awareness and helping the individual to self monitor and self-evaluate. The **global strategy** utilized in CO-OP is the **Goal-Plan-Do-Check**. The global strategy provides a structure within which the therapist or client can talk through the problems encountered in task performance.

Domain Specific Strategies is an array of specific cognitive strategies, which focus on facilitating or improving performance that are task, client, or environment specific. There are eight domain specific strategies used in CO-OP**: body position, task specification/modification, feeling the movement, verbal motor mnemonic, verbal rote script, verbal instruction, verbal self-instruction, and attention to doing.**

Enabling Principles of CO-OP

A number of enabling principles have been developed in CO-OP to help the client learn to talk him/herself through occupational performance problems, use cognitive strategies, develop occupational skills and transfer and generalize learning. These have been taken from general principles of learning. Enabling principles are an important part of the CO-OP approach and are used throughout the therapeutic intervention. They are captured in 6 imperatives:

- Make It Fun: Experience with CO-OP indicates that therapists who are good in their interactions with the clients have the greatest success in getting them to use cognitive strategies and to improve occupational performance.
- Promote Good Strategy Use: Strategies form the bridge between abilities and skill acquisition.. They suggest that effective use of cognitive strategies involves the coordination of many components including: sufficient task knowledge; a broad repetition of strategies; and the realization that effort and strategy use will affect performance.
- Frame It in Goal-Plan-Do-Check: Throughout the intervention, the global strategy Goal-Plan-Do-Check provides the framework for solving performance problems. The therapist guides the client through the process of articulating the performance goal, developing a plan, carrying out the plan, and checking the effectiveness of the plan.
- One Thing at a Time: Client learn best when one thing is presented at a time. While the therapist may identify a number of issues that need to be addressed, it is important to keep the client focused on only one thing and not to place excessive attentional demands on the client.
- Work Toward Independence: The nature of the interaction between the therapist and client changes over the course of CO-OP intervention. During the initial phases, the therapist takes the lead role in modeling the application of the strategy. As the client becomes more competent in strategy use, the therapist slowly relinquishes the lead role so that the client can take the lead in solving performance problems.
- Guided Discovery**:** The process of guided discovery is explained by four catch phrases: ‘‘Ask, don’t tell,’’ ‘‘guide, don’t adjust,’’ ‘‘make it obvious,’’ and ‘‘bridge beyond.’’ The therapist also helps the client to develop and test out plans (as part of the Goal-Plan-Do-Check strategy) for achieving their goals. The process of guided discovery is an iterative one and occurs throughout the therapy.

Caregiver Involvement: caregiver involvement in the CO-OP approach is crucial to promote the client’s ongoing skill acquisition, strategy use, and generalization and transfer of learning.

IMPACT OF STROKE ON FUNCTION:

The stroke survivors even after longer time after the incident have residual functional limitations.

Approximately two thirds of stroke survivors have residual neurological deficits that impair function and approximately 50% are left with disabilities making them dependent on others for activities of daily living. The specificity of impairment are quite heterogeneous and varies with the particular regions of the central nervous system (CNS) that has sustained damage. Among the more common are physical impairments in upper limb use. Upper limb dysfunction remains an important hurdle for many stroke survivors. Only 5% of adult stroke survivors regain full function of the upper limb and 20% regain no functional use. The key to minimizing disability following stroke is rehabilitation to retrain patients to improve their capacity.

In Basic ADL skills such as feeding, bathing, dressing, and toileting are also compromised during acute stroke, with 67 to 88 percent of patients demonstrating partial or complete dependence. Independence in ADL also improves with time with only 31 percent of survivors requiring partial or total assistance a year later. The ability to perform functional tasks is influenced by a number of factors. Motor and perceptual impairments have the greatest impact on functional performance, but other factors include sensory loss, disorientation, communication disorders, and reduced cardiorespiratory endurance. Enablement factors include high motivation, stable supportive family, financial resources, and intensive training with repetitive practice.[27]

MIDDLE CEREBRAL ARTERY INFARCT:[27]

The middle cerebral artery (MCA) is the second of the two main branches of the internal carotid artery and supplies the entire lateral aspect of the cerebral hemisphere (frontal, temporal, and parietal lobes) and subcortical structures, including the internal capsule (posterior portion), corona radiata, globus pallidus (outer part), most of the caudate nucleus, and the putamen.

The most common characteristics of MCA syndrome are contralateral spastic hemiparesis and sensory loss of the face, upper extremity (UE), and lower

extremity (LE), with the face and UE more involved than the LE. Lesions of the parieto-occipital cortex of the dominant hemisphere (usually the left hemisphere) typically produce aphasia. Lesions of the right parietal lobe of the nondominant hemisphere (usually the right hemisphere) typically produce perceptual deficits (e.g., unilateral neglect, anosognosia, apraxia, and spatial disorganization). Homonymous hemianopsia (a visual field defect) is also a common finding. The MCA is the most common site of occlusion in stroke. The Clinical Manifestations of Middle Cerebral Artery Syndrome are

- Contralateral hemiparesis involving mainly the UE and face (LE is more spared)
- Contralateral hemisensory loss involving mainly Primary the UE and face (LE is more spared)
- Motor speech impairment: Broca's or nonfluent aphasia with limited vocabulary and slow, hesitant speech hemisphere.
- Receptive speech impairment: Wernicke's or fluent aphasia with impaired auditory comprehension and fluent speech with normal rate and melody.
- Global aphasia: nonfluent speech with poor comprehension.
- Perceptual deficits: unilateral neglect, depth perception, spatial relations, agnosia
- Limb-kinetic apraxia
- Contralateral homonymous hemianopsia
- Loss of conjugate gaze to the opposite side
- Ataxia of contralateral limb(sensory ataxia)
- Pure motor hemiplegia (lacunar stroke

CEREBELLAR INFARCT:

The cerebellum is a part of the brain that controls balance and coordination of the body and coordination of eye movements. The blood vessels that reach the cerebellum are called the superior cerebellar artery, the anterior inferior cerebellar artery, and the posterior inferior cerebellar artery. A disruption in blood flow through any of these arteries result in cerebellar stroke.

About 85% of symptomatic cerebellar infarcts occur in the territory of the posterior inferior cerebellar artery (PICA), in the inferior, medial portion of the hemisphere, they are grossly hemorrhagic about 25% of the time.

Dizziness, nausea, vomiting, headache, lack of balance, and difficulty walking are the most common presenting symptom.The most striking sign is truncal ataxia, which might be expected since both processes involve the deeper portions of the cerebellum including the vermis.

There are some trademark stroke signs that may be present when someone has a cerebellar stroke, and this can help your doctors identify the stroke. These include jerking of the arms or legs, subtle shaking of the body, and a jerking appearance of the eyes when they move from left to right. However, not everyone with cerebellar stroke has these signs- it depends on how large the stroke and its exact location within the cerebellum.[7]

THALAMIC BLEED

The thalamus can be thought of as a "relay station," receiving signals from the brain's outer regions (cerebral cortex), interpreting them, and then sending them to other areas of the brain to complete their job. The thalamus has dense connections to all the parts of the brain and receives information from all parts of the brain. Only a small part of the thalamus receives input from the outside world or sends information to the outside world. Mostly the thalamus helps the cortex and other cells deep within the brain to communicate with each other.The thalamus have many functions, including:

- It manages our sensitivity to temperature, light and physical touch and controlling the flow of visual, auditory and motor information;
- The thalamus is involved in motivation, attention and wakefulness;
- It's in charge of our sense of balance and awareness of our arms and legs;
- It controls how we experience pain;
- It's also involved in aspects of learning, memory, speech and understanding language; and
- Even emotional experiences, expression and our personalities involve the thalamus

If both sides are injured, destroying connections to the rest of the brain, it may result in coma. "Fortunately, the brain's wiring has a degree of plasticity, and if the stroke is only in the thalamus, some people can recover and do quite nicely because

the rest of the brain has ways of making up for it. But they may not completely return to normal. Because the thalamus shares its blood supply with the brainstem, occipital lobe and temporal lobe of the brain, strokes in those areas can also affect the thalamus. Depending on which lobe is affected, the survivor may experience visual field loss (hemianopsia), memory loss or problems with swallowing and breathing. Recovery is more challenging for these strokes because there are many more areas of the brain involved.[23]

REVIEW OF LITREATURE

COOP INTERVENTION:

Erin Henshaw, Helen Polatajko, Sara McEwen, Jennifer D. Ryan, Carolyn M. Baum (feb 2011)[3] did a study using CO–OP to guide treatment with 2 older women. They stated that **most interventions directed treatment and evaluated outcomes at the impairment level and that there is a "persistent need" to evaluate the effects of interventions on "relevant, functional, outcomes. The CO–OP approach is directed specifically at relevant, functional outcomes, and the intervention was associated with performance improvements in functional outcomes** in the two cases presented here. The findings of the study suggested that this approach has the potential to successfully help clients with stroke achieve their everyday occupational goals. The study was concluded by saying that **it is a possible alternative for shifting the focus of rehabilitation from addressing impairments to improving the skills of everyday life**. Motivating goals, customized guided discovery, and structure and support may be important for adapting the CO–OP approach for use with the stroke population.

Helene J. Polatajko, Sara E. Mcewen, Jennifer D. Ryan, Carolyn M. Baum (feb 2012)[5] did another study compared changes in client performance on three goals post stroke after the Cognitive Orientation to daily Occupational Performance (CO–OP) intervention or standard occupational therapy (SOT) . Eight people living in the community after stroke received CO–OP (n=4) or SOT (n =4). CO–Op, cognitive-oriented approach to improve performance that uses client-driven cognitive strategies was provided for 10 sessions, SOT was therapist driven and combined task-specific and component based training. Goal performance was measured by the therapist-rated Performance Quality Rating Scale (PQRS) and the participant-rated Canadian Occupational Performance Measure (COPM). In the study they mention that **the process of learning dynamic performance analysis and problem-solving strategies in concert with meaningful skill acquisition enables the patient to transfer both strategies and skills to any novel situations**. The paper concludes stating that both treatment groups improved their performance of complex, self-selected activities, but **CO–OP treatment was associated with significantly greater improvements than SOT** despite a very small sample size.

A study conducted by Sara e. Mcewen, Helene j. Polatajko Maria P. J. Huijbregts & Jennifer d (dec 2009).[11] Ryan suggested the use of **cognitive strategies has potential to improve skill performance in people living with the effects of stroke, but there is no specific protocol has been identified**. This study aimed to explore the potential of using the Cognitive Orientation to daily Occupational Performance (CO-OP) protocol to improve the functional performance of adults with chronic stroke. Single case experimental design studies with two replications were conducted. Three community-dwelling participants were recruited for the study. Each of them selected three functional goals for the focus of the CO-OP intervention and a 1-month follow-up was conducted. **The findings lend additional evidence to the role of cognition and specifically executive functions in motor skill acquisition**. The study also stated that the neurophysiological evidence suggests an important cognitive component exists in tasks that are often considered to be purely motor-based and this lends support to the use of cognitive-strategy based approaches such as CO-OP. The study results showed that **CO-OP treatment approach is associated with significant improvements in the performance of the majority of complex,** self-selected goals and clinically significant improvements in self-perceived performance and performance satisfaction.

Si-nae Ahn, Min-ye Jung, Hae-yean Park, Ji-yeon Lee, Yoo-im Choi and Eun-young Yoo, (2017)[4] conducted a study to find out the effects of CO-OP approach on occupational performance of individuals with hemiparetic stroke. The study was designed as a 5-week, randomized study. 43 participants who were diagnosed of stroke for first time were enrolled in this study. The participants were assigned to experimental (n=20) and control group (n=23). The experimental group underwent CO-OP approach while the control group had to undergo conventional occupational therapy on occupational performance components. This study measured Canadian Occupational Performance Measure (COPM) and Performance Quality Rating Scale (PQRS). As a result of this research, **CO-OP approach was identified to be effective to increase the occupational performance of patients, and a positive influence was given to generalization and transfer of acquired skills.**

Sara mcewen, Helene Polatajko, Carolyn Baum, Jorge Rios, Dianne Cirone, Meghan Doherty, and Timothy Wolf (Jan 2015) [18] did a study aiming to find out the effect of the Cognitive Orientation to daily Occupational Performance (CO-OP) approach compared with the usual outpatient rehabilitation on activity and participation in patients <3 months poststroke. An exploratory, single-blinded, randomized controlled trial, was conducted. Participants were referred to 2 stroke rehabilitation outpatient programs and were allocated to receive either usual care or CO-OP. The primary outcome was to measure the actual performance of trained and untrained self-selected activities, using the Performance Quality Rating Scale (PQRS). Additional outcomes measures used were the Canadian Occupational Performance Measure (COPM), the Stroke Impact Scale Participation Domain, the Community Participation Index, and the Self-Efficacy Gauge. The study concluded that **incorporating the CO-OP approach as part of an outpatient rehabilitation program is associated with a large effect at follow-up on actual performance of trained and untrained self-selected functional activities** compared with programs incorporating usual occupational therapy. Thus suggesting COOP not only improved performance on skills trained in rehabilitation but also transfer of cognitive strategy training to permit those living with the effects of stroke to learn new skills outside of the rehabilitation setting as the need arises.

A study conducted by Camille Skubik-peplaski, Cheryl Carrico, Laurel Nichols, Kenneth Chelette, Lumy Sawaki (nov 2012)[12] We evaluated the effects of occupation-based intervention on post stroke upper-extremity (UE) motor recovery, neuroplastic change, and occupational performance. A 55 year old chronic stroke patient with moderately impaired UE motor function is made to participate in 15 sessions of occupation based intervention. The behavioral motor function (Fugl-Meyer Assessment, Stroke Impact Scale, Canadian Occupational Performance Measure)and the neural plasticity (transcranial magnetic stimulation [TMS]) were assessed as the base line and post intervention. The results of this study indicated that a **brief period of occupation based intervention in a hospital setting designed to simulate a home environment considerably enhanced affected UE motor recovery, neuroplastic change, and occupational performance** for 1 participant with chronic stroke.

Elizabeth R. Skidmore, Margo B. Holm, Ellen M. Whyte, Mary Amanda Dew, Deirdre Dawson & James T. Becke (2011)[16] did a study to examine the feasibility of administering meta-cognitive strategy training to an individual with cognitive impairments who was simultaneously engaged in inpatient rehabilitation after acute stroke. A 31-year-old college-educated patient was selected for the study. On rehabilitation admission, the patient was 7 days post-stroke and presented with mild impairments in attention and severe impairments in visuospatial functions (visual attention and visuospatial relations) and delayed memory. The outcome were measured using ADL disability at rehabilitation admission and discharge using the Functional Independence Measure and the Performance Assessment of Self-Care Skills. The results of the study demonstrated **despite mild impairments in attention and executive functions, and severe impairments in visuospatial function and delayed memory, the patient exhibited the ability to learn and apply the meta-cognitive strategy to his daily activities. Thus, based these results they suggest that the meta-cognitive strategy training appears to be feasible for implementation during inpatient rehabilitation.**

A study was conducted by Deirdre R. Dawson, Arvinder Gaya, Anne Hunnt, Brian Levine Carolyn Lemsky , Helene J. Polatajko (april 2009)[19] to test the applicability of cognitive orientation to occupational performance approach (COOP) to use with adults having executive dysfunction that arise from traumatic brain injury (TBI). .A single-case design was used. 3 adults, 5 to 20 years post-TBI and also their self-identified significant others were included in the study. Assessments were done by neuropsychological tests and the Canadian Occupational Performance Measure. The intervention included guiding patients to use a meta-cognitive problem-solving strategy to perform self-identified daily tasks that they needed and wanted to do and with which they were having difficulties. The intervention was conducted over 20 one-hour sessions in participants' environments. Results of the study show that the **approach produces positive changes in both trained and untrained goals, though stronger effects are seen for trained goals**. **Positive changes were reported not only by both participants but their significant others**, with effects maintained even three-month follow-up assessment.

OTHER CONTEMPORARY ADL INTERVENTIONS:

Dora YL Chan, Chetwyn CH Chan and Derrick KS Au (2006) [9] conducted a study to find out the effectiveness of the motor relearning approach to promote physical function and task performance for patients with a stroke. 52 out patients with either a thrombotic or hemorrhagic stroke completed either the experimental or control group. The patients received 18 2-h sessions in six weeks either the motor relearning program or conventional therapy program. The outcome measures used were the Berg Balance Scale, the Timed Up and Go Test, the Functional Independence Measure (FIM), the modified Lawton Instrumental Activities of Daily Living (IADL) test, and the Community Integration Questionnaire. The study conclusion showed that **the motor relearning program was found to be effective in enhancing functional recovery of patients with stroke**.

Gajanan Bhalerao, Vivek Kulkarni, Chandali Doshi, Savita Rairikar, Ashok Shyam and Parag Sancheti (sep 2013)[17] did a study aiming to compare the effectiveness of Motor Relearning program (MRP) versus Bobath approach on Activities of Daily Living (ADL's) and ambulation at every two week's interval in Acute Stroke Rehabilitation in first six weeks training. 32 subjects with first unilateral stroke (middle cerebral artery territory involvement) were included in the study. They were randomly allocated into Group A included 17 subjects underwent Motor Relearning Program (MRP) and Group B, 15 subjects underwent management based on Bobath approach for a period of six weeks. The outcome measures used were Functional Independence Measure and Barthel Index used for ADL assessment and Functional ambulation category and Dynamic gait index for ambulation performance. **The results were found to be clinically significant and thus MRP approach can be used in early phase of rehabilitation** for improving activities of daily living and ambulation as it includes daily task specific activities, which are required for ADLs & thereby it helps in getting good co-operation from patients.

A study was conducted by el-Bahrawy MN, Elwishy AAB (Jun 2012)[14] to find out the effectiveness of motor relearning program on improving hand functions in chronic stroke patients. It was a single blinded randomized controlled study design. 40 stroke patients selected and randomly allocated into two groups. They were provided 2 hours session three days per week for six weeks for the affected upper limb. The

control group received treatment based on Bobath approach while the experimental group underwent the motor relearning program. The results showed that a significant difference was found in experimental group only for hand grip strength and ulnar deviation after treatment. The study **concluded by stating that Motor relearning program has substantial effect on improving hand grip strength and decreasing spasticity of ulnar deviation** but not the fine hand functions or wrist flexor spasticity.

Chanuk Yoo and JuhYung Park (May 2015)[10] conducted a study to examine the improvement on hand function and activities of daily living in stroke patients after implementing task-oriented training. Thirty-two patients who were diagnosed with stroke and had undergone rehabilitation therapy participated in the task-oriented training. The task-oriented training was provided for 30 min per day for 4 weeks. Their hand function and activities of daily living was evaluated before and after the training. The results of the study suggested that the **task-oriented training had a significant impact in terms of improving hand function and activities of daily living**.

JackieBosch, MartinJ.O'Donnell, SusanBarreca, LehanaThabane, and LaurieWishart (2014)[15] conducted a study To determine if task oriented practice provided soon after stroke is more effective than usual care in improving post stroke upper extremity motor recovery and to. A systematic review of the literature was performed from1950 to November2012, to determine randomized controlled trials of task-oriented practice compared to usual care, or to indentify different amounts of task-oriented practice to improve motor impairment and activity. Studies were exclude specific types of interventions were used as comparators or if they were of poor methodological quality. The results of the study showed that three of the six studies demonstrated a statistically significant effect of task-oriented practice. **The results demonstrate that an increase in the amount of task-oriented practice after stroke may result in reduce in upper extremity impairment;** further research on both effect and required dosage is needed as results are in consistent.

CONCEPTUAL FRAMEWORK

The CO-OP is a client centered approach which emphasizes that cognition plays an important role in the acquisition of occupational skills and also the development of occupational competency. This approach can be used to promote the acquisition of new skills and the improvement of existing skills.

CO-OP provides a different orientation in comparison with the traditional approach. In contrast with traditional approaches, CO-OP is focused directly on occupational performance issues and is a verbal approach.

During treatment, the patient is actively engaged in problem solving during performance and testing the solutions. The assumption states that occupational performance is a complex multivariate phenomenon resulting from the interaction of person, environment and occupation.

In CO-OP, a global problem-solving strategy is used to frame the development of domain specific strategies that helps in successful task performance and promote skill acquisition.

INTERVENTION STRUCTURE:

The therapy sessions were offered in a structures format. CO-OP is usually delivered over twelve, one-to-one sessions, each of approximately one hour in length.. The therapy process was divided into five phases: Preparation, Assessment, Introduction, Acquisition and Consolidation.

Orientation on CO-OP	• Establish contact with client and caregiver • Client and caregiver was then oriented to Cognitive Orientation to daily Occupational Performance (CO-OP)
Assessment	• Administered Canadian Occupational Performance Measure (COPM) and identify the ADL goals. • Baseline of client's performance was measured using the Performance Quality Rating Scale (PQRS), Functional Independence Measure (FIM), Fugyl Meyer Assessment(FMA)

SESSION 1 Introduce global strategies.	Global Cognitive Strategy: Goal-Plan-Do-Check (GPDC) was introduced • Therapist teaches the client to apply the strategy • The client practices the strategy • The caregivers are also asked to observe.
Session 2-10	• Dynamic Performance Analysis is conducted : Ongoing Whenever the client performs an ADL task he is asked to analyse performance from which he findout definite problems which should be worked upon for skill acquisition. Eg:The client while performing eating identifies a problem of holding the plate in the affected hand (left hand) while eating. So he came up with a plan of using table to rest the plate and then use the left hand to stabilize it while eating. • Facilitate the clients acquisition and application of the Global Cognitive Strategy: Goal-Plan-Do-Check Every time the client comes up with a problem solving strategy he is asked to use them in goal-plan-do-check pattern to check whether the plan works or not. • Guided discovery of Domain Specific Strategies (DSS) and mediate their application to skill acquisition. The therapist helps the client to use proper domain specific strategies to improve the task performance. • Application of Enabling Principles The enabling principles used in the study were(1)promote good strategy use by providing adequate task knowledge helping them bring out ideas and the application of strategies ,(2)frame it in GPDC: Throughout the intervention GPDC helps the client in solving the ADL performance deficits. The role of therapist is to guide them in setting goals and bring about problem solving, (3)work towards independence :initial phase modeling the task sometimes is required as the intervention progress the client takes up the lead role and performs the self selected strategies, (4)guided discovery: this process continues throughout the sessions. The therapist guides patients to bring about better results.

	• Teach the caregivers about Goal-Plan-Do-Check and applicable Domain Specific Strategies The caregiver helps the clients to confine to the strategies in times other than the interventions.
Post-test	• Re-administered COPM, PQRS, Fugyl Meyer Assessment, FIM • Probe client for generalization and transfer of Global and Domain Specific Strategies: GOAL PLAN DO CHECK • Review and reinforce CO-OP , and cognitive strategy use with caregiver

Cognitive strategies:

. In CO-OP uses two kinds of strategies: a global strategy and domain-specific strategies. A global strategy focuses to self monitor and self-evaluate. The global strategy utilized in CO-OP is Goal-Plan-Do-Check. It helps the client to identify the proper solution to the ADL performance problems identified. Eg:

GOAL : I want to sit and wear a shirt independently.

PLAN : Try supported ssitting and wearing using more f unafected hand and affected hand as support

DO : Practice wearing the shirt

CHECK: Was I able to sit, hold the shirt properly and wear.

GPDC is taught to the client during the second intervention session, and reinforced throughout subsequent therapy sessions. Using GPDC the Domain Specific Strategies are developed. Domain Specific Strategies focus on facilitating and improving task performance.

The domain specific strategies used were body position (eg. Maintaining balanced sitting while performing dressing), task modification (using a table instead of holding the plate in affected hand while eating) verbal self-instruction (talking to self while performing it helped the clients for self correction), and attention to doing (eg. While dressing putting the affected arm inside first followed by the unaffected arm), feeling the movement (how does the limbs move while performing the tasks) and verbal instruction (given by the therapist feedback to help in better performance.)

The emphasis during intervention is on helping the client to see how he or she can set goals, plan actions, talk to him or herself through the process, and check outcomes. The therapist helps the client to acquire ADL performance skills, by enabling the client's application of cognitive strategies to selected task performance.[9]

METHODOLOGY

PLACE OF STUDY:

The study is conducted in Kovai Medical Center and Hospital and Coimbatore Physiotherapy foundation.

STUDY DESIGN:

- The study is Quantitative, two group pre-test and post-test quasi experimental design.
- The study involves a control group and an experimental group.

TARGET POPULATION:

Patients with stroke

SAMPLE SIZE:

Sample size was determined by the formula;

Proportions of subjects in group 1=$q_1=N_1/N_{TOTAL}=0.500$

Proportions of subjects in group 0=$q_0=1-q_1=0.500$

α =1.5= threshold probability for rejecting the null hypothesis(type 1 error rate)

β =0.84=probability of failing to reject the null hypothesis

A= $(1/q_1 + 1/q_0) = 4.00$

B= $(z_\alpha + z_\beta) = 7.84$

N=AB/ $(E/S)^2 = 16$

$N_1=8$, $N_0=8$, $N_{TOTAL}=16$

16 (8 in the experimental group and 8 in control group)

SAMPLING TECHNIQUE:

Convenient sampling, Random grouping, assigning the first patient in experimental group and second patient in control group and so on for the 16 samples consecutively.

SELECTION CRITERIA:

Inclusion Criteria:

- Patients affected with any type of stroke
- Age group between 40-70 years
- Sub-acute stroke (2-6mnths post stroke)
- Both genders

Exclusion Criteria:

- Global aphasia and expressive aphasia.
- Any cognitive impairment. (MOCA >_26)

VARIABLES

Independent variable

- Cognitive strategies of coop approach to improve ADL for the experimental group.
- MRP and Task Oriented Approach as regular ADL training methods for control group.

Dependent variable:

- ADL Performance of the subjects in experimental and control group.
- MOTOR performance of the subjects in experimental and control group.

Extraneous variable:

- The client's involvement and interest.
- The patient early discharge.
- Availability of patients during treatment sessions.
- The normal recovery process of the condition itself.

TOOLS USED

Screening Tools:

- Montreal Cognitive Assessment (MOCA)

Outcome Measures:

- Canadian Occupational Performance Measure (COPM)
- Performance quality rating scale (PQRS)
- Functional independence measure (FIM)
- Fugyl Meyer Assessment (FMA)

MONTREAL COGNITIVE ASSESSMENT (MoCA)

- The MoCA test was created in 1996.
- It was designed as a rapid screening instrument for mild cognitive dysfunction.
- It assesses different cognitive domains: attention and concentration, executive functions, memory, language, visuo constructional skills, conceptual thinking, calculations, and orientation.

Scoring

- Time to administer the MoCA is approximately 10 minutes.
- The total possible score is 30 points; a score of 26 or above is considered normal.

Psychometric properties [12]

Reliability:

Test-retest reliability (r = 0.92).

Internal consistency (α=0.83)

Validity:

Concurrent validity(r = 0.87).

CANADIAN OCCUPATIONAL PERFORMANCE MEASURE (COPM)

- The COPM is a criterion-based measure of occupational performance used to determine and prioritize intervention goals in which clients rate the level of importance , performance , and satisfaction with goals in areas of self-care, productivity, and leisure on a 10-point scale
- Using a semi-structured interview, the therapist initiates the COPM process by engaging the client in identifying daily occupations of importance that they want to do, need to do, or are expected to do but are unable to accomplish. Areas of everyday living explored during the interview include self-care, productivity or leisure.
- Once the therapist is confident that the client has identified the occupational performance problems experienced in everyday living, the second step of the COPM process is undertaken. In step two, the client is asked to rate the importance of each of the occupations to his/her life using a 10-point rating scale.
- In the third step of the COPM process, the client chooses the most important problems identified in step two to be addressed in intervention. The therapist enters the chosen problems and their importance ratings in the scoring section. This process serves as the basis for identifying intervention goals.
- In step four, the client is asked to use a 10 point scale to rate their own level of performance and satisfaction with performance for each of the five identified problems. The therapist calculates an average COPM performance score and satisfaction score. These typically range between 1 and 10, where 1 indicates poor performance and low satisfaction, respectively, while 10 indicates very good performance and high satisfaction.
- In this study only the self-care component of the COPM is considered.

Psychometric properties:[20]

- Test-retest value: -0.79 and 0.75
- Internal consistency 0.41 to 0.56 and satisfaction 0.71

PERFORMANCE QUALITY RATING SCALE (PQRS)

- The performance quality rating scale (PQRS) is observational tool intended to measure the actual performance of individual client-selected activities.
- The PQRS rates performance of participant selected activities on a 10-point scale, with a score of 1 indicating "can't do the skill at all" and 10 indicating "does the skill very well". The activities performed are determined using the COPM. The PQRS has substantial test-retest reliability and good internal responsiveness

Psychometric properties

Reliability:

- Inter rater reliability 0.83 to 0.93.Test–retest reliability was 40.80.

Validity:

- Convergent validity with the Canadian Occupational Performance Measure (COPM) was inconsistent, with scores ranging from low to moderate.

FUCNTIONAL INDEPENDENCE MEASURE (FIM)

- It is a tool devised to assess the patient's level of functional ability.
- It is intended to the population having any motor impairment associated with any condition.
- It helps to asses and grade the functional status of a person based o the level of assistance he or she requires. Grading categories range from total independence to total dependence.
- The FIM includes components such as self-care (which includes feeding, grooming, bathing, upper body dressing, lower body dressing, and toileting), bowel and bladder control, transfers, locomotion, communication, social cognition.

Scoring

FIM is a seven point scale ranging from 1-7, in which 1-totally dependent and 7 – totally dependent.

Psychometric Properties: [21]

Reliability:

- Internal consistency (α=0.91) at discharge.
- Test –retest reliability (r=0.90) is excellent, Motor FIM (ICC =0.90),Cognitive FIM (ICC=0.80)
- Inter-rater reliability ranging from 0.86 to 0.88
- Intra rater reliability were excellent =0.90-0.99

Validity:

- Concurrent validity has excellent co-relation between motor FIM with Barthel Index is ICC > 0.83
- Between motor FIM and modified ranking scale (r=0.89)
- Excellent co-relations were found between the motor and cognitive FIM and disability rating scale (r=0.64 and r=0.73)

FUGL MEYER ASSESMENT (FMA)

The Fugl-Meyer Assessment (FMA) is a stroke-specific, performance-based impairment index. It is designed to assess motor functioning, balance, sensation and joint functioning in patients with post-stroke hemiplegia.

The scale is comprised of five domains and there are 155 items in total:

- Motor functioning (in the upper and lower extremities)
- Sensory functioning (evaluates light touch on two surfaces of the arm and leg, and position sense for 8 joints)
- Balance (contains 7 tests, 3 seated and 4 standing)
- Joint range of motion (8 joints)
- Joint pain

Equipment :A chair, bedside table, reflex hammer, cotton ball, pencil and small piece of cardboard or paper, small can , tennis ball and stop watch and blindfold.

The assessment is performed in a quite area when the patient is maximal alert.

Scoring

- Scoring is based on direct observation of performance. Scale items are scored on the basis of ability to complete the item using a 3-point ordinal scale where 0=cannot perform, 1=performs partially and 2=performs fully. The total possible scale score is 226.

Psychometric properties[22]

Reliability:

- The test- retest reliability for total FMA scores (r =0.98-0.99), Motor domain UE (r =0.995 -0.996), Motor domain LE (r =0.96)
- Intra-rater reliability for the expert rater was high for the motor and sensory scores (range, 0.95–1.0).

Validity

Construct validity with motor assessment scale was found to be adequate to excellent negative correlation between score differences and levels of recovery (upper extremity r=0.50 and lower extremity r=0.69).

PROCEDURE

- An approval from the ethical committee, permission from the institutional head and consent from the patients and caregivers were attained.
- The samples were screened using Montreal Cognitive Assessment (MoCA) before the assessment.
- All the patients a score of <_26 in MoCA were considered for the study.
- A pretest was performed for the target population using COPM, PQRS, FIM, FUGL MEYER which is taken as the baseline of the patients motor and functional performance.
- The patients were classified into experimental and control group, 16 patients were randomly assigned in the experimental (8 patients) and the control group (8 patients) after the pretest.
- Next day after the pretest the experimental group was introduced to COOP which included 10 consecutive days of ADL training methods except for Sundays.
- The experimental group underwent regular occupational therapy for one hour and ADL session involving COOP for 45 minutes to 1 hour for 10 consecutive days.
- The control group underwent went standard occupational therapy treatment for 1 hour and regular ADL interventions for 1 hour for 10 consecutive days except for Sundays.
- After completing the 10 sessions both the groups underwent posttest using COPM, PQRS, FIM, FUGL MEYER to evaluate the motor and the ADL performance post intervention.
- The provided data are then subjected to statistical analysis.

INTERVENTION

COOP APPROACH (EXPERIMENTAL GROUP)

- The patient identifies the goals and is asked to give his strategies for goal attainment.
- The therapist can also suggest options to the client among which a proper strategy is chosen and the therapist guides the patients in application of the planned strategy.
- The patient has to apply the strategy to see if it works, if not achieved the therapist guides the patient in modifying the strategy.
- Eg: while training for dressing- the patient is asked to perform the action and then asked to list out the area of difficulty like buttoning and which part is difficult like holding the button or pushing the button through the hole. Then patient has to then come up with a corrective plan and has to practice it
- With each plan the patient has to repeat the Do- Check cycle until a proper strategy to achieve the goal is attained.
- The patient should then practice the taught strategy before the next session, the care giver is also taught the strategy for the adherence of practice.
- All the ADL components are considered for the intervention.

OTHER CONTEMPORARY APPROACHES (CONTROL GROUP)

- The control group will undergo standard occupational therapy treatment for their deficits and ADL will be trained using regular treatment approaches.
- The regular treatment approaches used were the Task Oriented Approach (TOI) and the Motor Re-learning program (MRP).
- MRP was applied to the clients on the basis of the four major concepts (1) analyses of the task, (2) finding the missing component, (3) practice of missing component and (4) practice of task and transference of training.

  Eg: the patient performs the task of dressing, he identifies the missing component as pulp to pulp to hold the button, then the specific movement is practiced and then the whole task of holding the button is practiced.

- In Task oriented approach the ADL skills uses the principles of motor leaning part practice and whole practice.eg: for brushing –part practice: holding the brush, hand to mouth and whole practice : practice the brushing task.

DATA ANALYSIS AND RESULTS

This chapter discusses the analyses of the collected data. The aim of this study was to find out the effectiveness of using COOP approach to improve ADL performance in patients with stroke.

STATISTICAL DESCRIPTION OF THE VARIABLES

For this study analyses were done using SPSS for windows (version 20.0). Descriptive analyses were performed to characterize the groups and inferential analyses to compare the performance of the groups (Mann Whitney U, Wilcoxon) were used.

- Pretest scores of experimental group and control group analyzed through the Mann Whitney U test. (table 5)
- Post test scores of experimental group and control group analyzed through the Mann Whitney U test.(table 6)
- Pretest and posttest and both experimental group and control group separately were analyzed using the Wilcoxon signed rank test. (table 3, and table 4 respectively)
- To compare the means of experimental group and control pre-and post and to find out the effect size from the groups paired sample t-test and Effect Size Calculator formula were used respectively. (table 7)

Effect Size:

$$d = M_1 - M_2 / \text{Spooled}$$

$$\text{Spooled} = \sqrt{[(S_1^2 + S_2^2) / 2]}$$ where

d is the descriptive measure(difference between the means) Cohen's

M_1 and M_2 are means of posttest and pretest scores of each individual group.

Spooled is the pooled standard deviation (the square root of the average of the squared standard deviations S_1 and S_2) of each individual group.

An effect size of □0.2 to 0.2 is considered to be a small effect

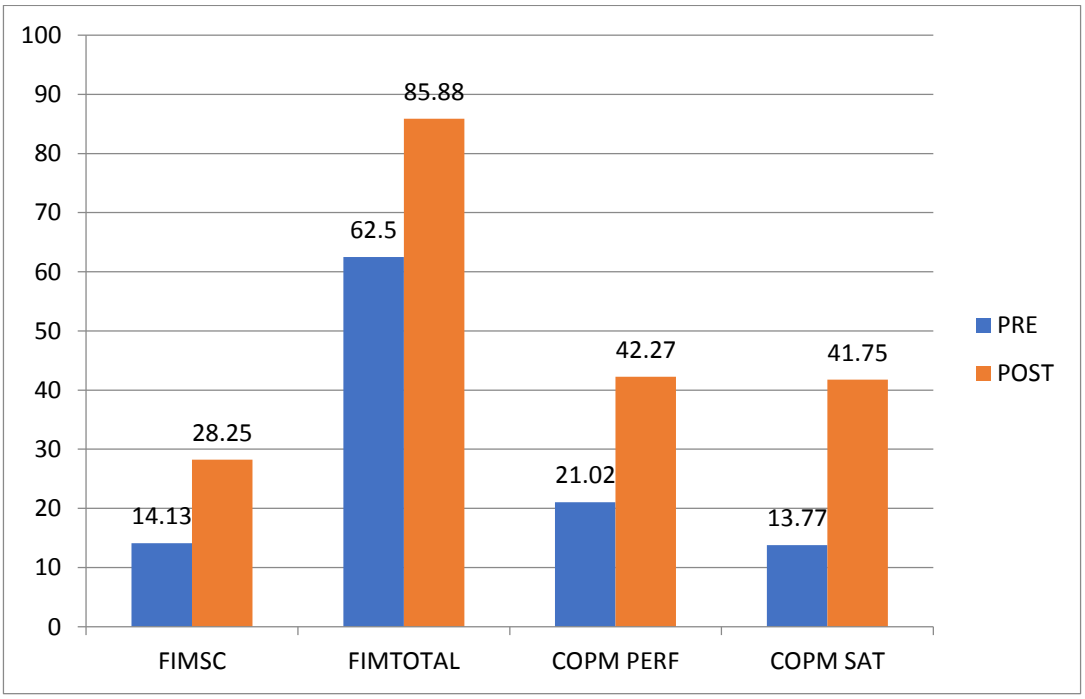
An effect size of 0.3 to 0.5 is considered to be a medium effect

An effect size of 0.6 to >0.8 is considered to be a greater effect

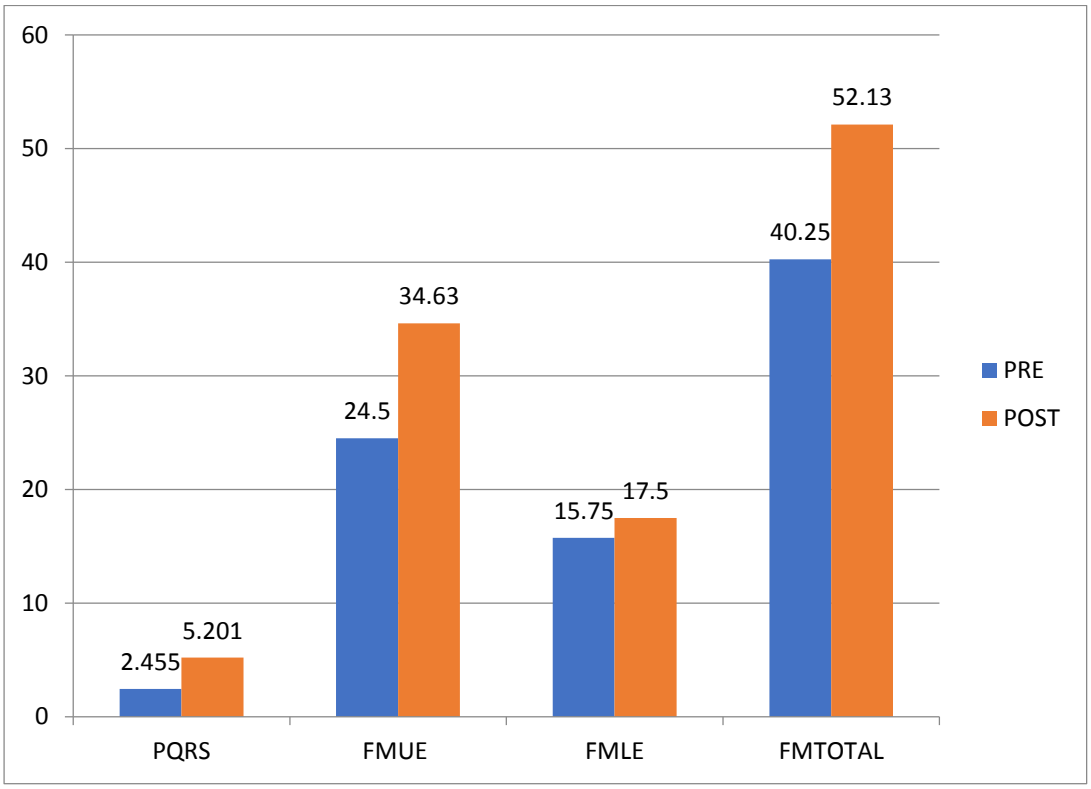
TABLE 1: DESCRIPTIVES OF EXPERIMENTAL GROUP

Variables		Mean		Sd	
		PRE	POST	PRE	POST
FIM	Self care	14.13	28.25	5.35	6.37
	Total	62.5	85.88	10.83	13.58
COPM	Performance	21.02	42.27	7.28	7.20
	Satisfaction	13.77	41.75	9.73	7.44
PQRS		2.45	5.20	1.20	1.09
Fugyl Meyer	Upper extremity	24.5	34.63	9.73	7.44
	Lower extremity	15.75	17.50	3.32	3.20
	Total	40.25	52.15	12.55	10.25

GRAPH 1a: COMPARISON OF FIM, COPM PRE AND POST TEST SCORES OF EXPERIMENTAL GROUP.



GRAPH1 b: COMPARISON OF PQRS, FUGYL MEYER (FMA) PRE AND POST TEST SCORES OF EXPERIMENTAL GROUP

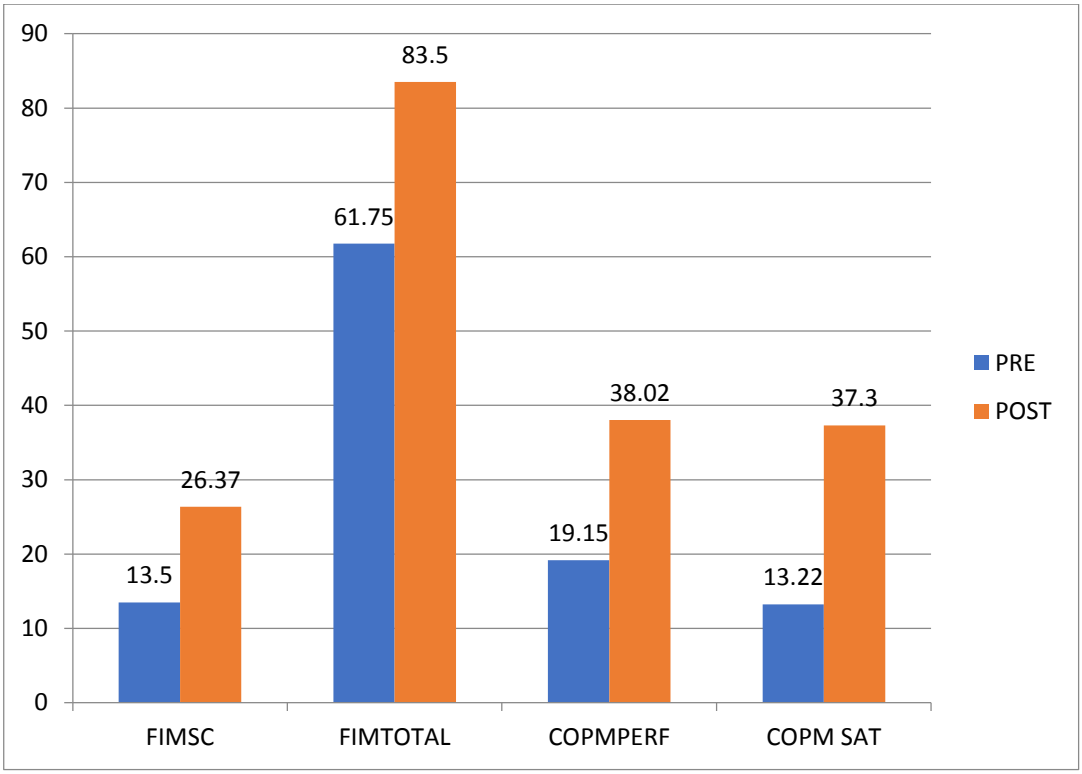


The above table 1 and graphs (1a,1b) show that there is improvement in post test scores of compared to the pretest scores of experimental group.

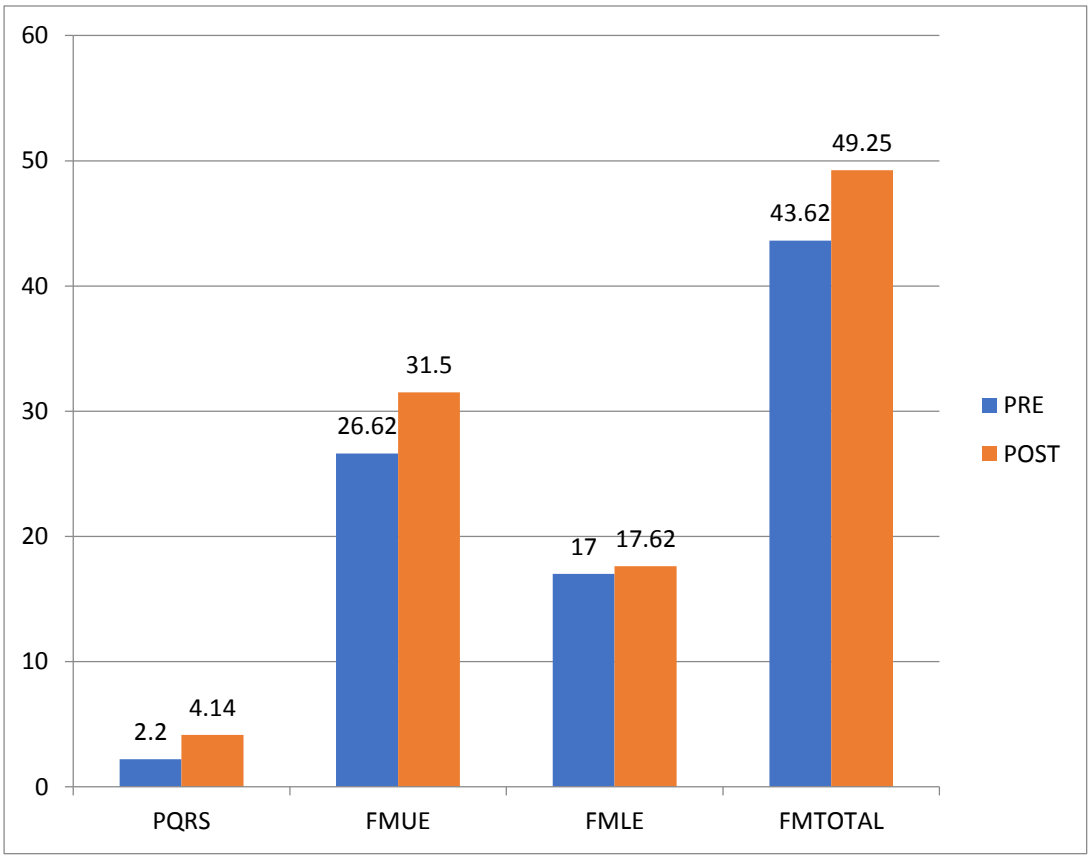
TABLE 2: DESCRIPTIVES OF CONTROL GROUP

VARIABLES		MEAN		SD	
		PRE	POST	PRE	POST
FIM	SELF CARE	13.5	26.37	4.53	6.34
	TOTAL	61.75	83.5	10.79	12.61
COPM	PERFORMANCE	19.5	38.02	7.62	8.73
	SATISFACTION	13.22	37.3	6.02	8.59
PQRS		2.20	4.14	0.99	0.78
FUGYL MEYER	UPPER EXTRIMITY	26.62	31.5	5.5	2.87
	LOWER EXTRIMITY	17	17.62	2.82	1.76
	TOTAL	43.62	49.25	6.8	6.34

GRAPH 2a: COMPARISON OF FIM AND COPM PRE AND POST TEST SCORES OF CONTROL GROUP



GRAPH 2b: COMPARISON OF FIM PRE AND POST TEST SCORES OF CONTROL GROUP



The above table (2)graphs(2a,2b) show that there is improvement in post test scores of PQRS,COPM,FUGYL MEYER and FIM compared to the pretest scores of control group.

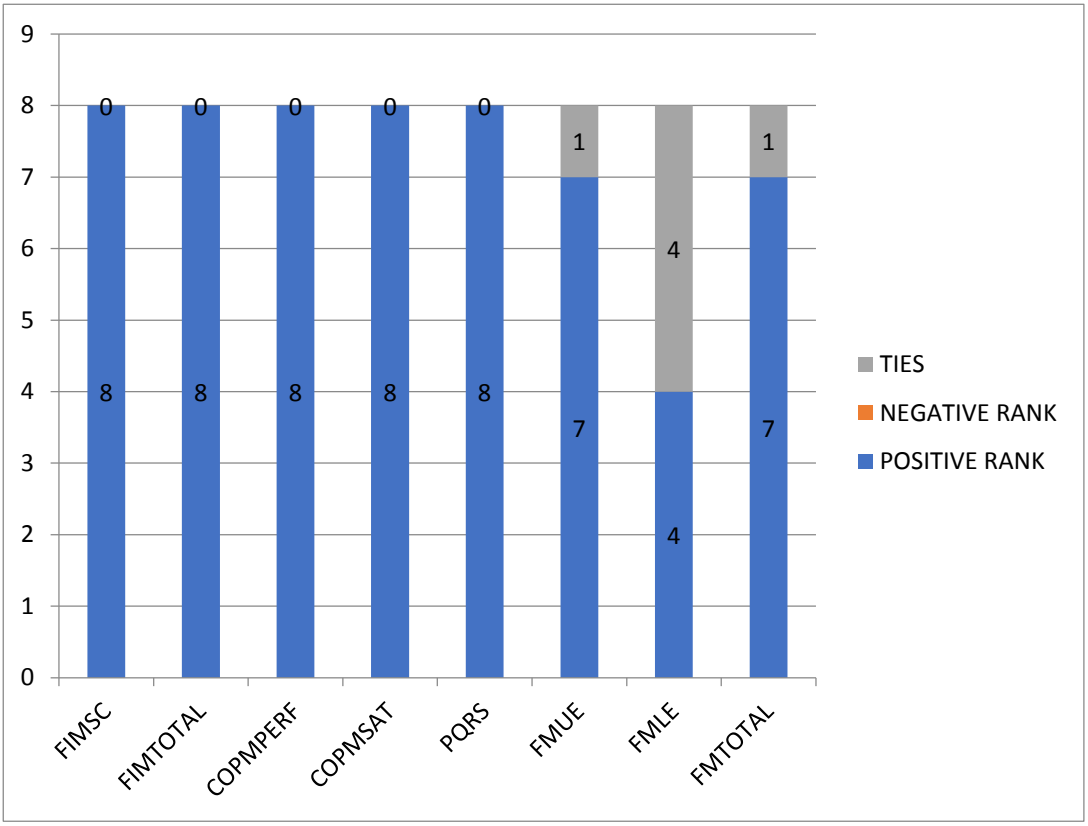
TABLE 3: WITHIN GROUP COMPARISON OF PRE AND POST TEST SCORES OF EXPERIMENTAL GROUP. (N=8)

Variables		Ranks			Mean rank	Sum of ranks	Z value	Sig. P value
		Positive	**Negative**	**Ties**				
FIM	Self-care	8	0	0	4.5	36	-2.552	**0.01**
	Total	8	0	0	4.5	36	-2.521	**0.01**
COPM	Performance	8	0	0	4.5	36	-2.524	**0.01**
	Satisfaction	8	0	0	4.5	36	-2.521	**0.01**
PQRS		8	0	0	4.5	36	-2.55	**0.01**
Fugyl Meyer	Upper extremity	7	0	1	4	28	-2.375	**0.02**
	Lower extremity	4	0	4	2.5	10	-1.841	0.06
	Total	7	0	1	4	28	-2.375	**0.02**

The above table (TABLE 3) shows that there is statistically significant difference ($p<0.05$) between PRE and post test scores of PQRS, COPM, Fugyl Meyer UE and total and FIM scales of experimental group. but there is no significant difference between the pre-post test scores of Fugyl Meyer LE.

This shows that there has been a significant improvement in clients ADL performance and the motor performance of the upper extremity, but in the lower extremity performance there is not much difference post intervention.

GRAPH 3: RANK VALUES OF EXPERIMENTAL GROUP



The above graph indicates the rank values of the experimental group. the FIM ,COPM,PQRS scores show 8 positive ranks, 0 negative and 0 ties indicating that there is improvement in all the patients. The Fugyl meyer UE and Fugyl meyer total showed 7 postive rank, 0 negative ranks ad 1 tie. The fugyl meyer Le shows 4 postive rank, 4 ties and 0 negative ranks.

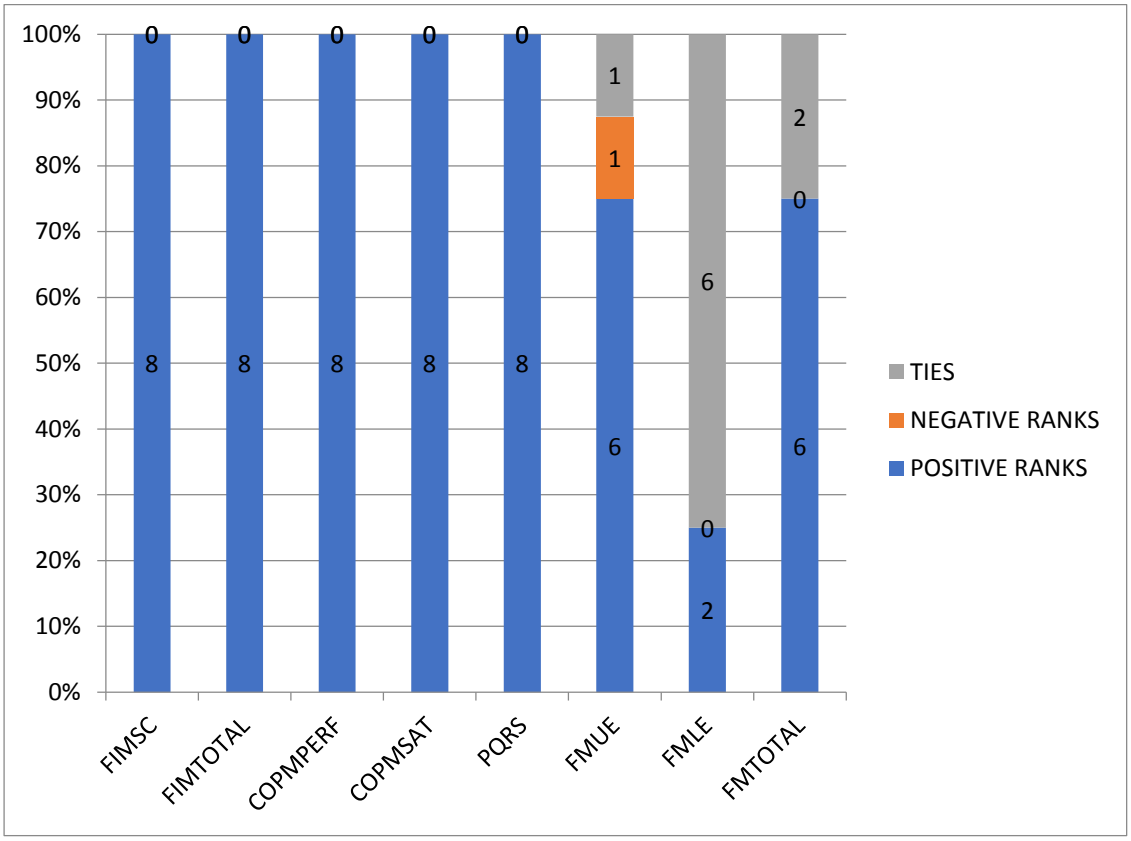
TABLE 4: WITHIN GROUP COMPARISON OF PRE AND POST TEST SCORES OF CONTROL GROUP. (N=8)

Variables		Ranks			Mean Rank	Sum of ranks	Z value	Sig. P value
		Positive	Negative	Ties				
FIM	Self-care	8	0	0	4.5	36	-2.524	**0.01**
	Total	8	0	0	4.5	36	-2.530	**0.01**
COPM	Performance	8	0	0	4.5	36	-2.521	**0.01**
	Satisfaction	8	0	0	4.5	36	-2.521	**0.01**
PQRS		8	0	0	4.5	36	-2.536	**0.01**
Fugyl Meyer	Upper extremity	6	1	1	4.5	27	-2.201	**0.02**
	Lower extremity	2	0	6	1.5	3	-1.342	0.18
	Total	6	0	2	2.5	21	-2.214	**0.02**

The above table (TABLE 4) shows that there is statistically significant difference ($p<0.05$) between PRE and post test scores of PQRS, COPM, Fugyl Meyer UE and total and FIM scales of control group.

But there is no significant difference between the pre-post test scores of Fugyl Meyer LE. This shows that there has been a significant improvement in clients ADL performance and the motor performance of the upper extremity, but in the lower extremity performance there is not much difference post intervention.

GRAPH 4: RANK VALUES OF CONTROL GROUP



The above graph indicates the rank values of the control group. The FIM, COPM, PQRS scores show 8 positive ranks, 0 negative and 0 ties indicating that there is improvement in all the patients.

The Fugyl Meyer UE scores show 6 positive ranks 1 negative rank and one tie indicating that 6 patients improved well from the pre test, 1 patient gone down the pretest level and one patient remained in the same level compared to the pretest.

Fugyl Meyer total showed 6 positive ranks, 0 negative ranks and 2 tie indicating that 6 patients improved well from the pre test and 2 patients remained in the same level from the pretest.

The Fugyl Meyer LE shows 4 positive rank, 4 ties and 0 negative ranks, indicating that 4 patients than the pretest scores and 4 patents remained in the same level as the pretest.

TABLE 5: BETWEEN GROUP COMPARISON OF PRE TEST SCORES OF EXPERIMENTAL AND CONTROL GROUPS.

Variables		Groups	Mean	Sd	Z value	Sig. P value
FIM	Self care	Experimental	14.13	5.35	-0.212	0.832
		Control	13.5	4.53		
	Total	Experimental	28.25	6.34	-0.633	0.527
		Control	26.37	6.34		
COPM	Performance	Experimental	21.02	8.23	-0.421	0.674
		Control	19.15	7.62		
	Satisfaction	Experimental	41.75	7.20	-1.210	0.226
		Control	38.02	8.73		
PQRS		Experimental	14.75	7.24	-0.264	0.792
		Control	13.25	5.99		
FUGYL MEYER	Upper extremity	Experimental	24.5	9.73	-0.579	0.562
		Control	26.62	5.5		
	Lower extremity	Experimental	15.75	3.32	-0.715	0.474
		Control	17	2.82		
	Total	Experimental	40.25	12.55	-0.420	0.674
		Control	43.62	6.8		

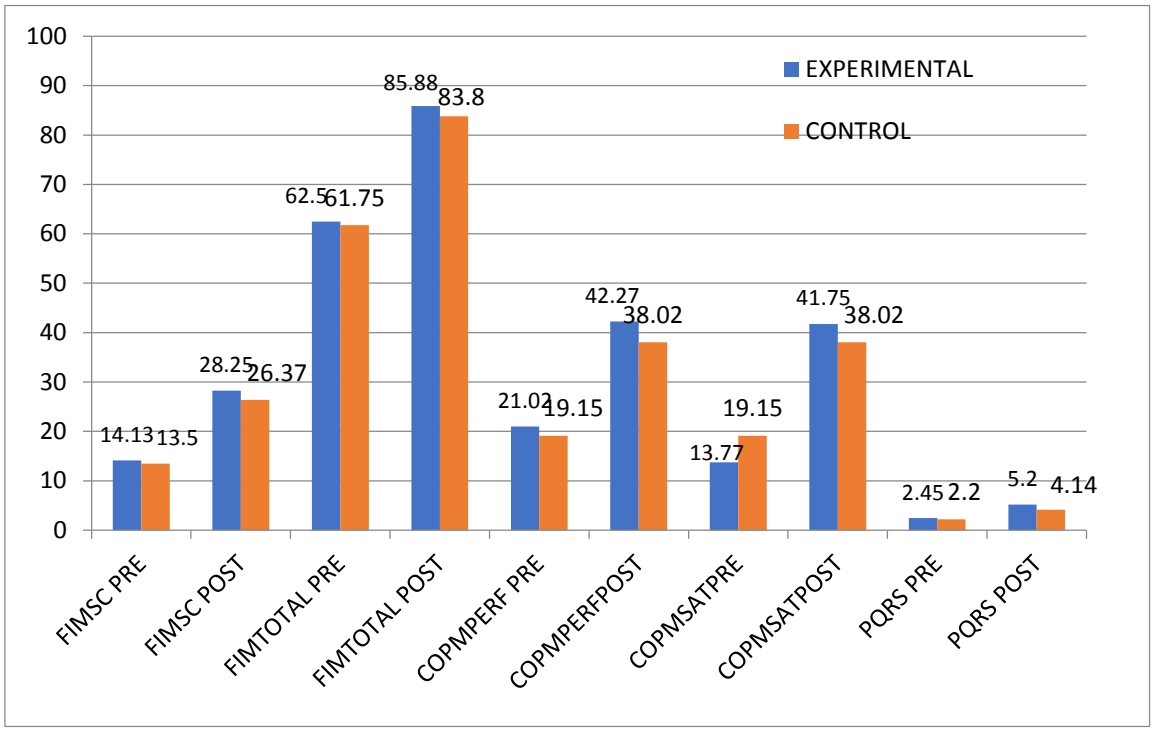
The above table indicates that there is no significance difference $p<0.05$ between the experimental groups thus indicating that the two groups are homogenous.

TABLE 6: BETWEEN GROUP COMPARISONS OF POST TEST SCORES OF EXPERIMENTAL AND CONTROL GROUPS.

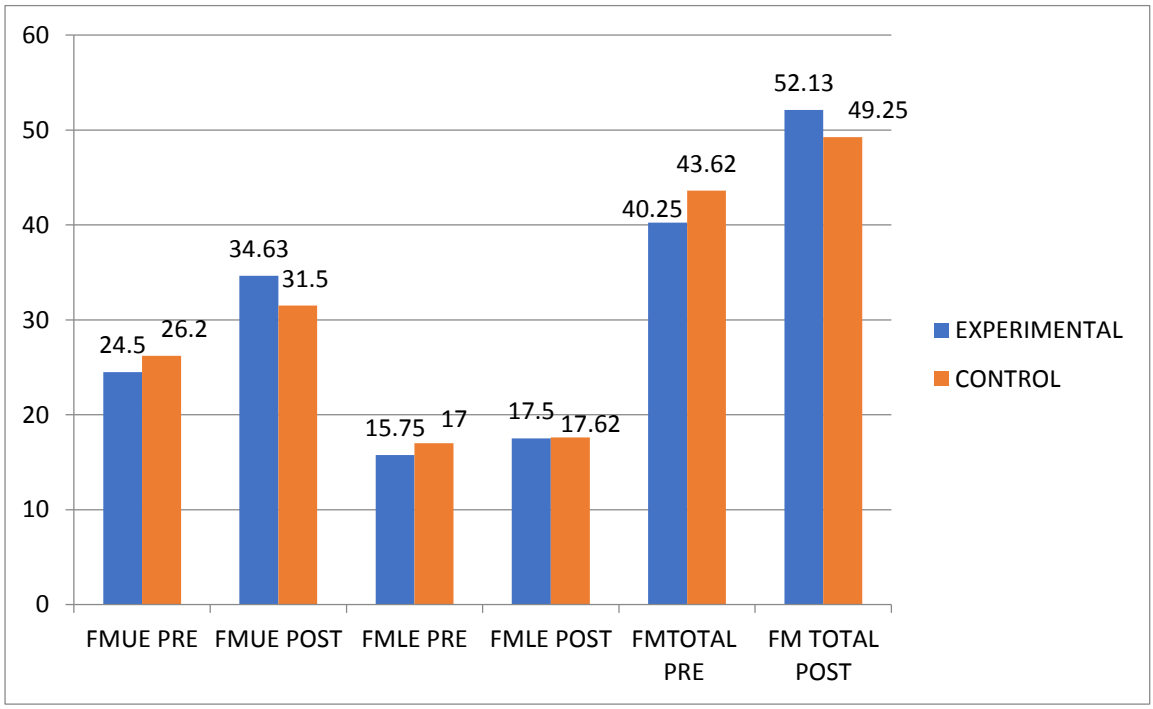
Variables		Groups	Mean	Sd	Z value	Sig. P value
FIM	Self care	Experimental	28.25	6.34	-0.633	0.527
		Control	26.37	6.34		
	Total	Experimental	85.88	13.58	-0.683	0.493
		Control	83.8	12.61		
COPM	Performance	Experimental	42.27	9.38	-1.210	0.226
		Control	38.02	8.73		
	Satisfaction	Experimental	41.75	7.20	-0.999	0.318
		Control	38.02	8.73		
PQRS		Experimental	31.13	6.44	-2.278	**0.023**
		Control	24.87	4.70		
Fugyl Meyer	Upper extremity	Experimental	34.63	7.44	-0.528	0.598
		Control	31.5	2.87		
	Lower extremity	Experimental	17.50	3.20	-0.221	0.825
		Control	17.62	1.76		
	Total	Experimental	52.13	10.25	-0.423	0.673
		Control	49.25	3.61		

The above table shows that there a significant difference between the control and experimental groups except for PQRS where it shows a significant difference of $p< 0.023$ .thus proving that the patients of the experimental and the control group have equally improved post intervention. Whereas, in PQRS the experimental group shows better improvement than the control group.

GRAPH 5a: COMPARISON OF SCORES PQRS, COPM, FIM SCORES OF CONTROL AND EXPERIMENTAL GROUP



GRAPH 5b: COMPARISON OF FUGYL MEYER SCORES OF CONTROL AND EXPERIMENTAL GROUP.

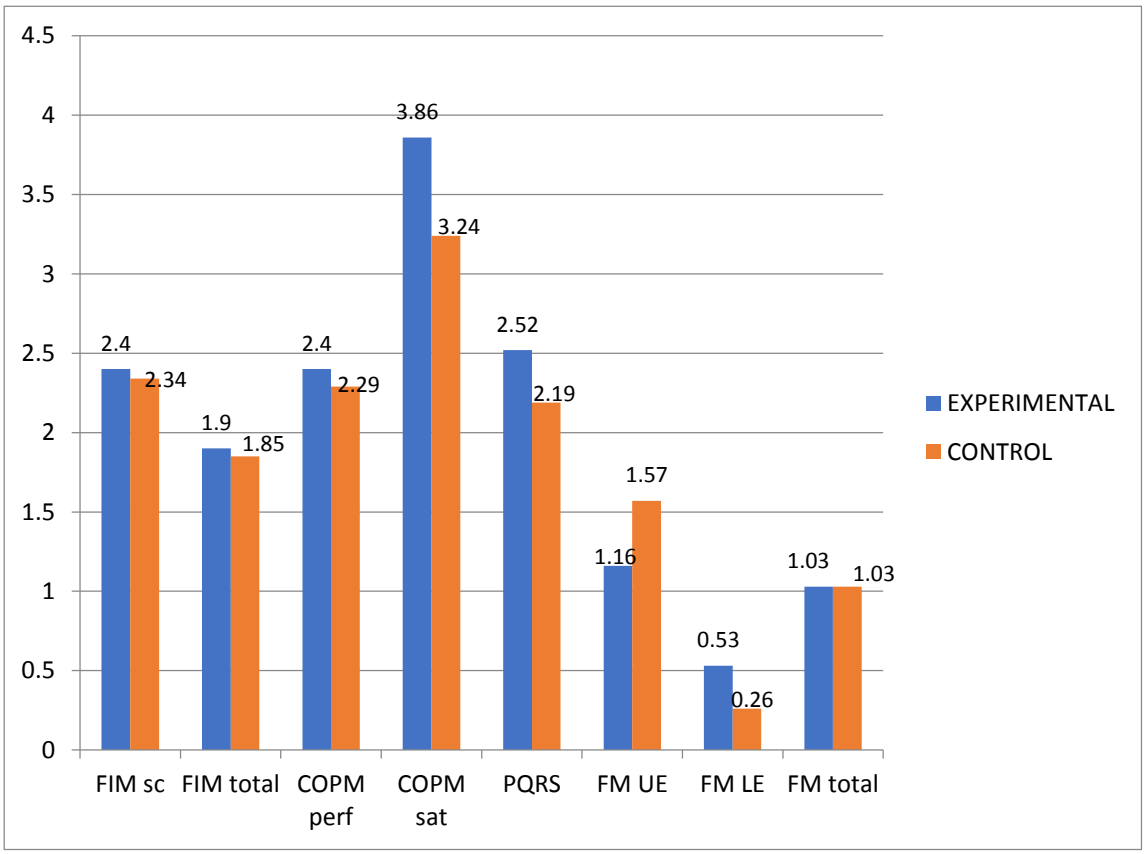


The above graphs 5a and 5b indicates that there is improvement in both the experimental and the control group post intervention.

Table 7: COMPARISON OF EFFECT SIZE OF EXPERIMENTAL AND CONTROL GROUPS.

VARIABLES	EXPERIMENTAL	CONTROL
FIM self care	2.409	2.34
FIM total	1.903	1.85
COPM PERFORMANCE	2.40	2.29
COPM SATISFACTION	3.80	3.24
PQRS	2.52	2.19
FUGYL MEYER UE	1.16	1.57
FUGYL MEYER LE	0.53	0.26
FUGYL MEYER TOTAL	1.03	1.03

GRAPH 6: COMPARISON OF EFFECT SIZE OF EXPERIMENTAL AND CONTROL GROUPS.

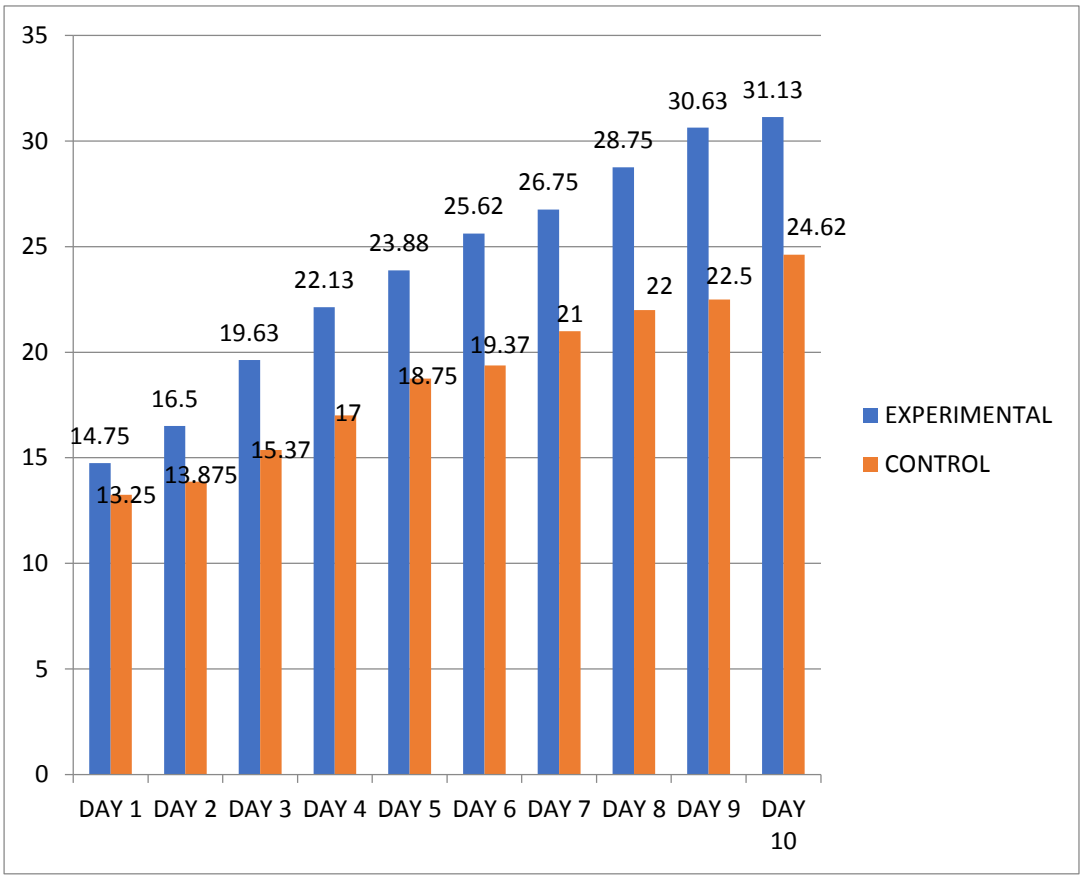


The above table (table 9) and graph (graph 9) shows the effect size of both control and experimental groups of PQRS, COPM, FUGYL MEYER and FIM.

Both the groups shows larger effect size (>0.8) and experimental group has larger effect size when compared to the control group for PQRS,COPM, FIM, Fugyl Meyer LE scores.

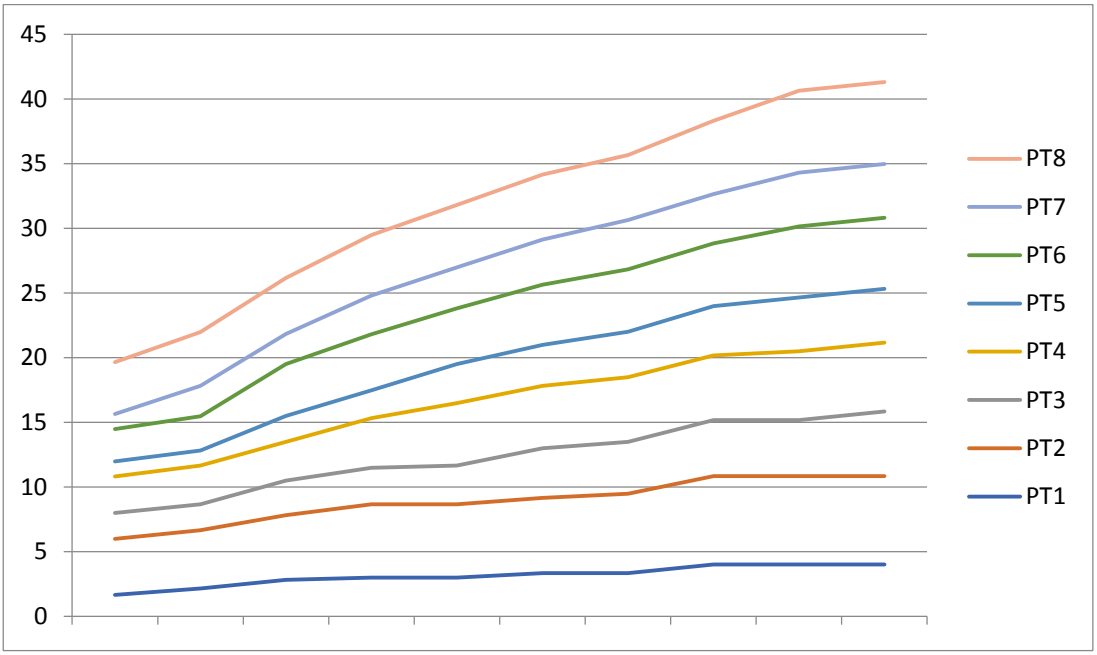
But for Fugyl Meyer UE scores control group shows larger effect size compared to the experimental group and shows similar effect size for Fugyl Meyer total scores.

GRAPH 7: COMPARISON OF EVERYDAY CHANGES OF MEAN PQRS SCORES BETWEEN EXPERIMENTAL AND CONTROL GROUPS.

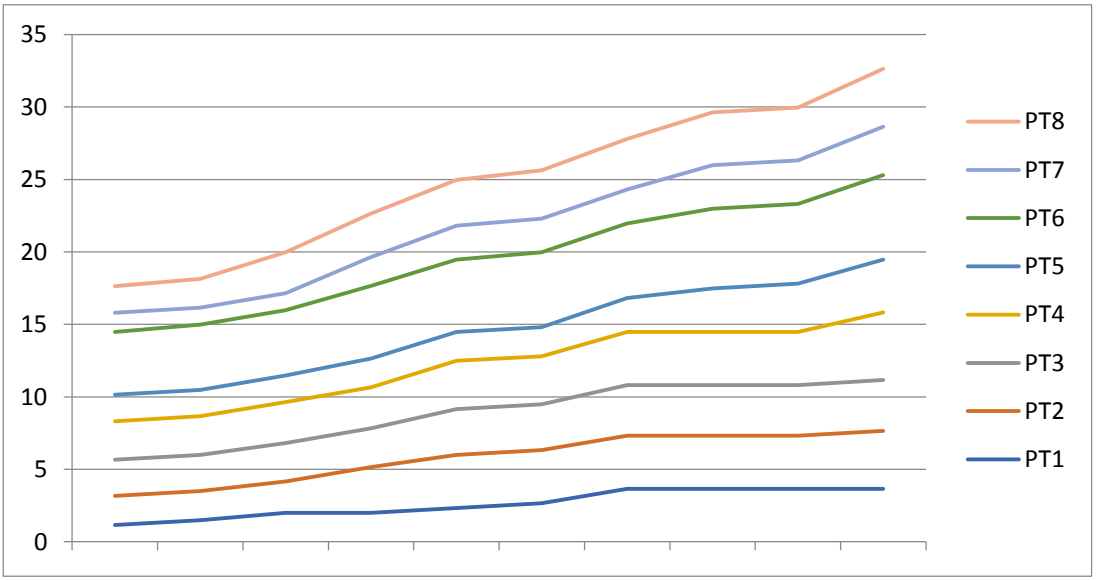


The above graph (graph 10) shows that there is improvement in PQRS scores from day 1 to day 10 in experimental and control groups.

GRAPH 8a: PQRS PERFORMANCE SCORES OF EXPERIMENTAL GROUP



GRAPH 8b: PQRS PERFORMANCE SCORES OF EXPERIMENTAL GROUP



The above graphs 8a and 8b shows that the patients of the experimental group started showing change in performance by the 2 and 3 sessions where as the control group patients had started showing improvement slightly later.

The maximum PQRS scores attained by the experimental group reached a value of 6.83 where as the maximum value attained by the control group came only up to 5.83.

DICUSSION

The study was conducted among patients affected with stroke in and around Coimbatore aiming to find out the effectiveness of CO-OP approach in improving ADL performance in stroke.

16 patients with stroke were included in the study of which 8 patients were assigned to the experimental group and 8 patients were assigned to the control group. The age of the selected subjects ranged from 50 to 64 years with 5 men and 3 women in the experimental group(mean age 58.88) and the age of the selected subjects ranged from 55 to 65 years with 4 men and 4 women in the control group(mean age 59.62). The mean scores of the screening tool MoCA for the experimental group and the control group is 28.75 and 28 respectively.

In the experimental group 4 patients were diagnosed as cerebellar infarct, 3 patients as MCA infarct and 1 patient as thalamic bleed. In the control group 5 patients were diagnosed as MCA infarct, 2 patients as thalamic bleed and one as cerebellar infarct.

A comparison of the pre test scores of FIM, COPM, PQRS, FUGYL MEYER of both the experimental and control group (table -5) showed no significant difference thus making the two groups homogenous.

In the studies previously done, COPM which is self rated was used as the primary outcome measure, more over all the occupational performances were considered. Whereas, the present study focused only on the ADL performance of the client so FIM scale which is therapist rated and has definite scoring for all the ADL components is used as the primary outcome measure.

EFFECT OF COOP ON ADL:

The results obtained comparing the pretest and the post test of the experimental group (table 3) indicates that there has been significant difference in the FIM, COPM performance and satisfaction and the PQRS scores. Thereby proving that CO-OP intervention is effective in improving the ADL skills after stroke. Also when the effect size of the experimental groups were determined (table 7) it showed large

effect size for FIM self-care, FIM total, COPM performance, COPM satisfaction and PQRS scores. Thus proving the CO-OP intervention to be effective.

These results of the present study is supported with the results from a previous study done by Elizabeth R. Skidmore, Margo B. Holm, Ellen M. Whyte, Mary Amanda Dew, Deirdre Dawson & James T. Becke in 2011 proved that there were clinically meaningful changes in ADL while undergoing CO-OP approach.

EFFECT OF OTHER CONTEMPORARY APPROACHES ON ADL:

Dora YL Chan, Chetwyn CH Chan and Derrick KS Au in 2006 conducted a study and stated that patients undergoing motor re-learning program were found to perform significantly better on self-care and instrumental ADL tasks. Similar results were obtained from the control group of the present study where the pretest and posttest scores of FIM, COPM performance and satisfaction and PQRS (table 4) showed a significant difference, thereby proving that there is improvement in the ADL performance of the control group. These results were also supported by another study done by Chanuk Yoo and JuhYung Park which concludes that task-oriented training leads to significant improvement of stroke patient's ability to perform ADL.

When the effect size of the control group was determined, the results showed large effect size for FIM self-care, FIM total , COPM performance , COPM satisfaction and PQRS scores, which proves the control group treatment to be effective. These findings were supported by a study dne in 2013 by Gajanan Bhalerao, Vivek Kulkarni, Chandali Doshi, Savita Rairikar, Ashok Shyam and Parag Sancheti which stated that motor re-learning program can be used in the early phase of rehabilitation for improving ADL and ambulation.

EFFECT OF CO-OP ON MOTOR PERFORMANCE:

Sara e. Mcewen, Helene j. Polatajko Maria p. J. Huijbregts & Jennifer d in 2009 did a study using CO-OP approach and concluded that global cognitive strategy in CO-OP Goal-Plan-Do-Check helps to structure cognitive executive functions of planning, problem-solving and evaluating contributes to the increased efficiency of motor skill acquisition

The above findings provides support to the findings of the presnt study where, the comparison of pretest and post test scores of Fugyl Meyer Assessment (FMA) of the experimental group (table 3)presented that there was a significant difference in the upper extremity (UE) scores and the total scores showing major improvement in the UE performance. Whereas, the lower extremity (LE) did not show much improvement. When the effect size calculations were done it showed large effect size for FMA UE and FMA total and medium effect size for FMA LE scores which confirms that CO-OP intervention to be effective in improving the motor performance.

Camille Skubik-peplaski, Cheryl Carrico, Laurel Nichols, Kenneth Chelette, Lumy Sawaki stated in their study that a relatively brief period of occupation based intervention considerably enhanced affected UE motor recovery. However, they had not considered the recovery of the lower extremity. The present study results shows very small mean difference (1.75) in the LE scores in FMA. Further clarification is required in this regard which warrants for future research.

EFFECT OF OTHER CONTEMPORARY APPROACHES ON MOTOR PERFORMANCE:

A study conducted in 2015 by Chanuk Yoo and JuhYung Park suggested that hand function in stroke patients can be improved significantly by the task- oriented training. Also there is evidence indicating that Motor re-learning program promotes the patients in regaining normal motor skills.

These studies provide supportive evidence for the findings of the present study which showed significant difference in FMA UE and total showing that there was improvement in UE but the LE showed no much improvement. Determination of effect size also confirms this findings, where the FMA UE and FMA total showed large effect size and the FMA LE showed small effect size.

COMAPARISON OF INTERVENTIONS:

The scores from the Table 6 prove that there is a significant difference in there was a significant difference in the post test PQRS scores between the experimental and control group. This explains that the performance of the experimental group was better than that of the control group. This finding of the present study co-relates to

that of a study done by Helene J. Polatajko, Sara E. Mcewen, Jennifer D. Ryan, and Carolyn M. Baum in 2012 that showed CO-OP participants exhibited significantly greater improvement in performance and the PQRS scores compared when with Standard occupational therapy.

There was no significant difference in the score of FIM self-care, FIM total, COPM performance and COPM satisfaction. This explains that both the group improved equally in the above mentioned. Referring to the mean values from table 1 and 2 the experimental group had shown slightly higher mean difference (14.12 and 23.38)of self-care and total scores of FIM respectively that that of control group (12.87,21.75) respectively, The mean difference of COPM performance scores of experimental group (21.25)was higher than that of the control group(18.52) and the mean difference COPM satisfaction scores of experimental group (27.98)was higher than that of the control group(24.08) .

Helene J. Polatajko, Sara E. Mcewen, Jennifer D. Ryan, Carolyn M. Baumin their study had also stated that a change of two points or more on the COPM is considered to be clinically meaningful. In the present study the mean values of the pretest of COPM performance and COPM satisfaction of the experimental group were 21.02, 13.77 respectively has changed to 42.27 and 41.75 respectively after the intervention and that of the control group was performance 19.15, satisfaction 19.15 that changed to 38.02, 38.02 respectively . The raw scores of COPM is attached to the appendix. This proves that both the experimental and the control group had shown clinically meaningful improvements in majority of the selected in their goals.

When the post test scores of FMA of experimental and the control group were compared (table 6) there showed no significant difference proving that both the group had equally improved in the motor performance. Further the comparison of the effect size of the experimental and the control group for FIM self care (2.409,2.34) respectively, FIM total of experimental and control group (1.90,1.85) respectively, COPM performance of experimental and control group (2.40,2.29), COPM satisfaction of experimental and control group (3.86,3.24) respectively, PQRS of experimental and control group (2.52,2.19) respectively showed larger effect size scores, the experimental group showing slightly higher scores than the control group.

The above result is consistent with the findings of a study done by Si-nae Ahn, Min-ye Jung, Hae-yean Park, Ji-yeon Lee, Yoo-im Choi and Eun-young Yoo in 2017 which stated that CO-OP approach to be an effective treatment method in occupational therapy after stroke, and it has been confirmed to increase occupational performance by developing cognitive strategies rather than conventional occupational therapy. Providing more strength to these findings is a study done Helene J. Polatajko, Sara E. Mcewen, Jennifer D. Ryan, Carolyn M. Baumin which states that that CO-OP approach provides the participants with autonomy to contribute their ideas in treatment sessions and a structured global problem solving strategy which enables them to achieve higher levels of skill performance than they would from Standard occupational therapy.

The comparison of the effect size of the FMA scores of experimental and control group where FMA UE of experimental and control group (1.16,1.57)respectively, FMA LE of experimental and control group (0.53,0.26) respectively and FMA total scores of experimental and control group (1.03,1.03) respectively showed large effect size in FMA UE and control group showed larger effect size than the experimental group, FMA total scores showed large effect size in which both the groups presented with the same effect size and FMA LE had medium effect size in experimental and small effect size in control group.

The aim of the present study was focused on ADL development rather than movement. The UE was more emphasized during the intervention, Since all of the ADL skills involved UE functions. Thus the need to work on the lower extremity itself was reduced, and thus showed lower development.

The CO-OP intervention is proved to be effective despite mild impairments in attention and executive functions, and severe impairments in visuospatial function and delayed memory, the patient exhibited the ability to learn and apply the meta-cognitive strategy to his daily activities[16]. Therefore, the patients with stroke might have greater outcomes on applying these strategies to daily living activities.

It is also suggested in studies that CO-OP training has an impact n tony on the trained task even on the un-trained tasks[19], the patients were found to apply the global strategies to novel situation. Thus the approach stands out from the other approaches due its effect on generalization and transference of training.

IMPLICATION:

The CO-OP approach focuses on client centeredness, on person, environment and occupation, guided discovery of self problem solving strategies and generalisibility. Because of this nature, this approach can be easily incorporated into stroke rehabilitation programs. This would enable faster recovery, early discharge from hospital setup and facilitate greater independence in ADL functions.

CONCLUSION

CO-OP is an effective approach to improve ADL in patients with stroke. This can be summarized by the findings from the current study where the patients in the experimental group showed slightly higher improvement than the control group in the ADL.

The control group also showed improvement implicating that there is an effect from the other contemporary approach, yet since the experimental group had greater effect size than the control group. CO-OP approach seemed to show better outcomes.

LIMITATIONS AND RECOMMENDATION

LIMITATIONS:

- Small sample size
- The follow up study was not done to find out the generalisability of the CO-OP strategies.
- Lower extremity was not given much importance.

RECOMMENDATIONS:

- The future studies can be done on larger samples.
- In the future studies the follow up can be done to assess the transference and generasablility.
- There are studies suggesting that CO-OP can also improve performance in patients having cognitive impairment, however further studies need to be done in this regard.
- Future studies can be done to see the effectiveness of CO-OP approach in improving performance of untrained goals.

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CANADIAN OCCUPATIONAL PERFORMANCE MEASURE

Authors:
Mary Law, Sue Baptiste, Anne Carswell,
Mary Ann McColl, Helene Polatajko, Nancy Pollock

The Canadian Occupational Performance Measure (COPM) is an individualized measure designed for use by occupational therapists to detect self-perceived change in occupational performance problems over time.

Client Name:		
Age:	Gender:	ID#:
Respondent (if not client):		
Date of Assessment:	Planned Date of Reassessment:	Date of Reassessment:

Therapist:
Facility/Agency:
Program:

Published by CAOT Publications ACE
Printed in Canada

STEP 1:
IDENTIFICATION OF OCCUPATIONAL PERFORMANCE ISSUES

To identify occupational performance problems, concerns and issues, interview the client, asking about daily activities in self-care, productivity and leisure. Ask clients to identify daily activities which they want to do, need to do or are expected to do by encouraging them to think about a typical day. Then ask the client to identify which of these activities are difficult for them to do now to their satisfaction. Record these activity problems in Steps 1A, 1B, or 1C.

STEP 2:
RATING IMPORTANCE

Using the scoring card provided, ask the client to rate, on a scale of 1 to 10, the importance of each activity. Place the ratings in the corresponding boxes in Steps 1A, 1B, or 1C.

STEP 1A: Self-care

IMPORTANCE

Personal Care
(e.g., dressing, bathing, feeding, hygiene)

_____ ☐
_____ ☐
_____ ☐

Functional Mobility
(e.g., transfers, indoor, outdoor)

_____ ☐
_____ ☐
_____ ☐

Community Management
(e.g., transportation, shopping, finances)

_____ ☐
_____ ☐
_____ ☐

STEP 1B: Productivity

Paid/Unpaid Work
(e.g., finding/keeping a job, volunteering)

_____ ☐
_____ ☐
_____ ☐

Household Management
(e.g., cleaning, laundry, cooking)

_____ ☐
_____ ☐
_____ ☐

Play/School
(e.g., play skills, homework)

_____ ☐
_____ ☐
_____ ☐

STEP 1C: Leisure

IMPORTANCE

Quiet Recreation
(e.g., hobbies, crafts, reading)

Active Recreation
(e.g., sports, outings, travel)

Socialization
(e.g., visiting, phone calls, parties, correspondence)

STEPS 3 & 4: SCORING - INITIAL ASSESSMENT and REASSESSMENT

Confirm with the client the 5 most important problems and record them below. Using the scoring cards, ask the client to rate each problem on performance and satisfaction, then calculate the total scores. Total scores are calculated by adding together the performance or satisfaction scores for all problems and dividing by the number of problems. At reassessment, the client scores each problem again for performance and satisfaction. Calculate the new scores and the change score.

Initial Assessment:

Reassessment:

OCCUPATIONAL PERFORMANCE PROBLEMS:	PERFORMANCE 1	SATISFACTION 1	PERFORMANCE 2	SATISFACTION 2
1.				
2.				
3.				
4.				
5.				

SCORING:

Total score = Total performance or satisfaction scores / # of problems

PERFORMANCE SCORE 1	SATISFACTION SCORE 1	PERFORMANCE SCORE 2	SATISFACTION SCORE 2
/ =	/ =	/ =	/ =

CHANGE IN PERFORMANCE = Performance Score 2 – Performance Score 1 =

CHANGE IN SATISFACTION = Satisfaction Score 2 – Satisfaction Score 1 =

ADDITIONAL NOTES AND BACKGROUND INFORMATION

Initial Assessment:

Reassessment:

APPENDIX D

Functional Independence Measure (FIM) Instrument

	ADMISSION	DISCHARGE	FOLLOW-UP
Self-Care			
A. Eating			
B. Grooming			
C. Bathing			
D. Dressing - Upper Body			
E. Dressing - Lower Body			
F. Toileting			
Sphincter Control			
G. Bladder Management			
H. Bowel Management			
Transfers			
I. Bed, Chair, Wheelchair			
J. Toilet			
K. Tub, Shower			
Locomotion			
L. Walk/Wheelchair			
M. Stairs			
Motor Subtotal Score			
Communication			
N. Comprehension			
O. Expression			
Social Cognition			
P. Social Interaction			
Q. Problem Solving			
R. Memory			
Cognitive Subtotal Score			
TOTAL FIM Score			

L E V E L S	**Independent** 7 Complete Independence (Timely, Safely) 6 Modified Independence (Device)	**NO HELPER**
	Modified Dependence 5 Supervision (Subject = 100%+) 4 Minimal Assist (Subject = 75%+) 3 Moderate Assist (Subject = 50%+) **Complete Dependence** 2 Maximal Assist (Subject = 25%+) 1 Total Assist (Subject = less than 25%)	**HELPER**
Note: Leave no blanks. Enter 1 if patient is not testable due to risk.		

FUGL-MEYER ASSESSMENT
LOWER EXTREMITY (FMA-LE)
Assessment of sensorimotor function

ID:
Date:
Examiner:

Fugl-Meyer AR, Jaasko L, Leyman I, Olsson S, Steglind S: The post-stroke hemiplegic patient. 1. a method for evaluation of physical performance. Scand J Rehabil Med 1975, 7:13-31.

E. LOWER EXTREMITY

I. Reflex activity, supine position			**none**	**can be elicited**
Flexors: knee flexors			0	2
Extensors: patellar, Achilles			0	2
		Subtotal I (max 4)		

II. Volitional movement within synergies, supine position			**none**	**partial**	**full**
Flexor synergy: Maximal hip flexion (abduction/external rotation), maximal flexion in knee and ankle joint (palpate distal tendons to ensure active knee flexion).	Hip	flexion	0	1	2
	Knee	flexion	0	1	2
	Ankle	dorsiflexion	0	1	2
Extensor synergy: From flexor synergy to the hip extension/adduction, knee extension and ankle plantar flexion. Resistance is applied to ensure active movement, evaluate both movement and strength.	Hip	extension	0	1	2
		adduction	0	1	2
	Knee	extension	0	1	2
	Ankle	plantar flexion	0	1	2
		Subtotal II (max 14)			

III. Volitional movement mixing synergies, sitting position, knee 10cm from the edge of the chair/bed		**none**	**partial**	**full**
Knee flexion from actively or passively extended knee	no active motion	0		
	no flexion beyond 90°, palpate tendons of hamstrings		1	
	knee flexion beyond 90°, palpate tendons of hamstrings			2
Ankle dorsiflexion compare with unaffected side	no active motion	0		
	limited dorsiflexion		1	
	complete dorsiflexion			2
	Subtotal III (max 4)			

IV. Volitional movement with little or no synergy, standing position, hip at 0°		**none**	**partial**	**full**
Knee flexion to 90° hip at 0°, balance support is allowed	no active motion / immediate and simultaneous hip flexion	0		
	less than 90° knee flexion or hip flexion during movement		1	
	at least 90° knee flexion without simultaneous hip flexion			2
Ankle dorsiflexion compare with unaffected side	no active motion	0		
	limited dorsiflexion		1	
	complete dorsiflexion			2
	Subtotal IV (max 4)			

V. Normal reflex activity supine position, evaluated only if full score of 4 points achieved on earlier part IV, compare with unaffected side				
Reflex activity knee flexors, Achilles, patellar	0 points on part IV or 2 of 3 reflexes markedly hyperactive	0		
	1 reflex markedly hyperactive or at least 2 reflexes lively		1	
	maximum of 1 reflex lively, none hyperactive			2
	Subtotal V (max 2)			
	Total E (max 28)			

F. COORDINATION/SPEED, supine, after one trial with both legs, blind-folded, heel to knee cap of the opposite leg, 5 times as fast as possible		**marked**	**slight**	**none**
Tremor		0	1	2
Dysmetria	pronounced or unsystematic slight and systematic no dysmetria	0	1	2
		> 5s	**2 - 5s**	**< 1s**
Time	more than 5 seconds slower than unaffected side 2-5 seconds slower than unaffected side maximum difference of 1 second between sides	0	1	2
	Total F (max 6)			

H. SENSATION, lower extremity blind-folded, compared with unaffected side		**anesthesia**	**hypoesthesia dysesthesia**	**normal**
Light touch	leg foot	0 0	1 1	2 2
		absence, less than 3/4 correct	**3/4 correct considerable difference**	**correct 100% little or no difference**
Position small alterations in the position	hip knee ankle great toe (IP-joint)	0 0 0 0	1 1 1 1	2 2 2 2
	Total H (max12)			

J. PASSIVE JOINT MOTION, lower extremity					**J. JOINT PAIN** during passive motion, lower extremity		
compare with unaffected side		only few degrees	decreased	normal	pronounced constant pain during or at the end of movement	some pain	no pain
Hip	Flexion	0	1	2	0	1	2
	Abduction	0	1	2	0	1	2
	External rotation	0	1	2	0	1	2
	Internal rotation	0	1	2	0	1	2
Knee	Flexion	0	1	2	0	1	2
	Extension	0	1	2	0	1	2
Ankle	Dorsiflexion	0	1	2	0	1	2
	Plantar flexion	0	1	2	0	1	2
Foot	Pronation	0	1	2	0	1	2
	Supination	0	1	2	0	1	2
Total (max 20)					**Total** (max 20)		

E. LOWER EXTERMTY	/28
F. COORDINATION / SPEED	/6
TOTAL E-F (motor function)	/34

H. SENSATION	/12
J. PASSIVE JOINT MOTION	/20
J. JOINT PAIN	/20

FUGL-MEYER ASSESSMENT UPPER EXTREMITY (FMA-UE) Assessment of sensorimotor function

ID:
Date:
Examiner:

Fugl-Meyer AR, Jaasko L, Leyman I, Olsson S, Steglind S: The post-stroke hemiplegic patient. A method for evaluation of physical performance. Scand J Rehabil Med 1975, 7:13-31.

A. UPPER EXTREMITY, sitting position

I. Reflex activity	none	can be elicited
Flexors: biceps and finger flexors (at least one)	0	2
Extensors: triceps	0	2
Subtotal I (max 4)		

II. Volitional movement within synergies, without gravitational help			none	partial	full
Flexor synergy: Hand from contralateral knee to ipsilateral ear. From extensor synergy (shoulder adduction/ internal rotation, elbow extension, forearm pronation) to flexor synergy (shoulder abduction/ external rotation, elbow flexion, forearm supination). **Extensor synergy:** Hand from ipsilateral ear to the contralateral knee	Shoulder	retraction	0	1	2
		elevation	0	1	2
		abduction (90°)	0	1	2
		external rotation	0	1	2
	Elbow	flexion	0	1	2
	Forearm	supination	0	1	2
	Shoulder	adduction/internal rotation	0	1	2
	Elbow	extension	0	1	2
	Forearm	pronation	0	1	2
Subtotal II (max 18)					

III. Volitional movement mixing synergies, without compensation		none	partial	full
Hand to lumbar spine hand on lap	cannot perform or hand in front of ant-sup iliac spine	0		
	hand behind ant-sup iliac spine (without compensation)		1	
	hand to lumbar spine (without compensation)			2
Shoulder flexion 0°- 90° elbow at 0° pronation-supination 0°	immediate abduction or elbow flexion	0		
	abduction or elbow flexion during movement		1	
	flexion 90°, no shoulder abduction or elbow flexion			2
Pronation-supination elbow at 90° shoulder at 0°	no pronation/supination, starting position impossible	0		
	limited pronation/supination, maintains starting position		1	
	full pronation/supination, maintains starting position			2
Subtotal III (max 6)				

IV. Volitional movement with little or no synergy		none	partial	full
Shoulder abduction 0 - 90° elbow at 0° forearm pronated	immediate supination or elbow flexion	0		
	supination or elbow flexion during movement		1	
	abduction 90°, maintains extension and pronation			2
Shoulder flexion 90° - 180° elbow at 0° pronation-supination 0°	immediate abduction or elbow flexion	0		
	abduction or elbow flexion during movement		1	
	flexion 180°, no shoulder abduction or elbow flexion			2
Pronation/supination elbow at 0° shoulder at 30°- 90° flexion	no pronation/supination, starting position impossible	0		
	limited pronation/supination, maintains start position		1	
	full pronation/supination, maintains starting position			2
Subtotal IV (max 6)				

V. Normal reflex activity assessed only if full score of 6 points is achieved in part IV; compare with the unaffected side		0 (IV), hyper	lively	normal
biceps, triceps, finger flexors	2 of 3 reflexes markedly hyperactive or 0 points in part IV	0		
	1 reflex markedly hyperactive or at least 2 reflexes lively		1	
	maximum of 1 reflex lively, none hyperactive			2
Subtotal V (max 2)				

Total A (max 36)

B. WRIST support may be provided at the elbow to take or hold the starting position, no support at wrist, check the passive range of motion prior testing		**none**	**partial**	**full**
Stability at 15° dorsiflexion elbow at 90°, forearm pronated shoulder at 0°	less than 15° active dorsiflexion dorsiflexion 15°, no resistance tolerated maintains dorsiflexion against resistance	0	1	2
Repeated dorsifexion / volar flexion elbow at 90°, forearm pronated shoulder at 0°, slight finger flexion	cannot perform volitionally limited active range of motion full active range of motion, smoothly	0	1	2
Stability at 15° dorsiflexion elbow at 0°, forearm pronated slight shoulder flexion/abduction	less than 15° active dorsiflexion dorsiflexion 15°, no resistance tolerated maintains dorsiflexion against resistance	0	1	2
Repeated dorsifexion / volar flexion elbow at 0°, forearm pronated slight shoulder flexion/abduction	cannot perform volitionally limited active range of motion full active range of motion, smoothly	0	1	2
Circumduction elbow at 90°, forearm pronated shoulder at 0°	cannot perform volitionally jerky movement or incomplete complete and smooth circumduction	0	1	2
Total B (max 10)				

C. HAND support may be provided at the elbow to keep 90° flexion, no support at the wrist, compare with unaffected hand, the objects are interposed, active grasp		**none**	**partial**	**full**
Mass flexion from full active or passive extension		0	1	2
Mass extension from full active or passive flexion		0	1	2
GRASP				
a. Hook grasp flexion in PIP and DIP (digits II-V), extension in MCP II-V	cannot be performed can hold position but weak maintains position against resistance	0	1	2
b. Thumb adduction 1-st CMC, MCP, IP at 0°, scrap of paper between thumb and 2-nd MCP joint	cannot be performed can hold paper but not against tug can hold paper against a tug	0	1	2
c. Pincer grasp, opposition pulpa of the thumb against the pulpa of 2-nd finger, pencil, tug upward	cannot be performed can hold pencil but not against tug can hold pencil against a tug	0	1	2
d. Cylinder grasp cylinder shaped object (small can) tug upward, opposition of thumb and fingers	cannot be performed can hold cylinder but not against tug can hold cylinder against a tug	0	1	2
e. Spherical grasp fingers in abduction/flexion, thumb opposed, tennis ball, tug away	cannot be performed can hold ball but not against tug can hold ball against a tug	0	1	2
Total C (max 14)				

D. COORDINATION/SPEED, sitting, after one trial with both arms, eyes closed, tip of the index finger from knee to nose, 5 times as fast as possible		**marked**	**slight**	**none**
Tremor	at least 1 completed movement	0	1	2
Dysmetria at least 1 completed movement	pronounced or unsystematic slight and systematic no dysmetria	0	1	2
		≥ 6s	**2 - 5s**	**< 2s**
Time start and end with the hand on the knee	at least 6 seconds slower than unaffected side 2-5 seconds slower than unaffected side less than 2 seconds difference	0	1	2
Total D (max 6)				

TOTAL A-D (max 66)	

H. SENSATION, upper extremity eyes closed, compared with the unaffected side		**anesthesia**	**hypoesthesia or dysesthesia**	**normal**
Light touch	upper arm, forearm palmary surface of the hand	0 0	1 1	2 2
		less than 3/4 correct or absence	**3/4 correct or considerable difference**	**correct 100%, little or no difference**
Position small alterations in the position	shoulder elbow wrist thumb (IP-joint)	0 0 0 0	1 1 1 1	2 2 2 2
			Total H (max12)	

J. PASSIVE JOINT MOTION, upper extremity, sitting position, compare with the unaffected side				**J. JOINT PAIN** during passive motion, upper extremity		
	only few degrees (less than 10° in shoulder)	decreased	normal	pronounced pain during movement or very marked pain at the end of the movement	some pain	no pain
Shoulder						
Flexion (0° - 180°)	0	1	2	0	1	2
Abduction (0°-90°)	0	1	2	0	1	2
External rotation	0	1	2	0	1	2
Internal rotation	0	1	2	0	1	2
Elbow						
Flexion	0	1	2	0	1	2
Extension	0	1	2	0	1	2
Forearm						
Pronation	0	1	2	0	1	2
Supination	0	1	2	0	1	2
Wrist						
Flexion	0	1	2	0	1	2
Extension	0	1	2	0	1	2
Fingers						
Flexion	0	1	2	0	1	2
Extension	0	1	2	0	1	2
Total (max 24)				**Total** (max 24)		

A. UPPER EXTREMITY	/36
B. WRIST	/10
C. HAND	/14
D. COORDINATION / SPEED	/ 6
TOTAL A-D (motor function)	/66

H. SENSATION	/12
J. PASSIVE JOINT MOTION	/24
J. JOINT PAIN	/24

MASTER CHART

COPM RAW SCORES OF EXPERIMENTAL GROUP

		EATING	DRESSING	GROOMING	BATHING	TOILETING
PT-1	PERF.PRE	2	2	2	2	1
	PERF. POST	6	4	4	4	4
	SAT.PRE	1	1	1	1	1
	SAT.POST	4	4	4	4	3
PT-2	PERF.PRE	4	4	5	5	4
	PERF. POST	7	7	7	7	6
	SAT.PRE	3	3	4	3	3
	SAT.POST	6	6	6	6	6
PT-3	PERF.PRE	2	2	2	2	2
	PERF. POST	5	4	4	4	4
	SAT.PRE	1	1	1	1	1
	SAT.POST	5	5	5	5	5
PT-4	PERF.PRE	3	3	3	3	3
	PERF. POST	6	6	5	5	4
	SAT.PRE	2	2	2	2	2
	SAT.POST	5	5	5	5	5
PT-5	PERF.PRE	2	2	2	2	1
	PERF. POST	5	5	5	5	5
	SAT.PRE	1	1	1	1	1
	SAT.POST	5	5	5	5	5
PT-6	PERF.PRE	4	3	2	2	2
	PERF. POST	6	4	4	4	5
	SAT.PRE	2	2	2	2	2
	SAT.POST	5	5	5	5	5
PT-7	PERF.PRE	3	2	2	2	2
	PERF. POST	5	5	4	4	4
	SAT.PRE	1	1	1	1	1
	SAT.POST	5	5	5	5	5
PT-8	PERF.PRE	2	2	3	2	3
	PERF. POST	7	6	6	6	6
	SAT.PRE	2	2	2	2	2
	SAT.POST	6	6	6	6	5

COPM SCORES OF CONTROL GROUP

		EATING	DRESSING	GROOMING	BATHING	TOILETING
PT-1	PERF.PRE	2	2	2	2	1
	PERF. POST	4	4	4	4	4
	SAT.PRE	1	1	1	1	1
	SAT.POST	3	3	3	3	3
PT-2	PERF.PRE	1	1	1	1	1
	PERF. POST	4	4	4	4	4
	SAT.PRE	1	1	1	1	1
	SAT.POST	4	4	3	3	3
PT-3	PERF.PRE	5	4	4	4	4
	PERF. POST	7	7	7	7	6
	SAT.PRE	4	3	3	3	3
	SAT.POST	7	7	6	6	6
PT-4	PERF.PRE	3	2	2	2	2
	PERF. POST	4	4	4	4	4
	SAT.PRE	1	1	1	1	1
	SAT.POST	4	4	4	4	4
PT-5	PERF.PRE	3	3	3	3	3
	PERF. POST	6	6	6	6	5
	SAT.PRE	3	2	3	2	2
	SAT.POST	5	5	5	5	4
PT-6	PERF.PRE	3	2	3	2	2
	PERF. POST	6	4	4	4	3
	SAT.PRE	2	1	2	1	1
	SAT.POST	4	4	4	4	4
PT-7	PERF.PRE	2	2	2	2	2
	PERF. POST	4	4	3	3	3
	SAT.PRE	1	1	1	1	1
	SAT.POST	5	5	5	5	5
PT-8	PERF.PRE	3	3	2	2	2
	PERF. POST	5	5	5	5	5
	SAT.PRE	3	2	3	2	2
	SAT.POST	6	6	6	5	5

CONTROL GROUP

	FUNCTIONAL INDEPENDENCE MEASURE [FIM]				CANADIAN OCCUPATIONAL PERFORMANCE MEASURE [COPM]				FUGYL-MEYER ASSESSMENT						PQRS	
S.NO	PRE FIM ADL	POST FIM ADL	PRE FIM TOTAL	POST FIM TOTAL	PRE COPM PER	PRE COPM SAT	POST COPM PER	POST COPM SAT	PRE FM UE	POST FM UE	PRE FM LE	POST FM LE	PRE FM TOTAL	POST FM TOTAL	PRE PQRS	POST PQRS
1	10.00	16.00	52.00	67.00	14.60	8.20	32.80	25.20	23.00	30.00	11.00	14.00	34.00	44.00	1.16	3.66
2	24.00	35.00	84.00	110.00	9.00	10.80	32.80	30.60	29.00	34.00	17.00	17.00	46.00	51.00	2.00	4.00
3	12.00	24.00	65.00	80.00	34.80	25.20	55.62	50.40	18.00	27.00	19.00	19.00	37.00	46.00	2.50	4.00
4	13.00	23.00	60.00	80.00	19.60	8.80	35.20	35.20	28.00	34.00	15.00	17.00	43.00	51.00	2.66	4.66
5	14.00	23.00	51.00	75.00	23.40	18.60	44.80	37.00	36.00	35.00	19.00	19.00	55.00	55.00	1.83	3.66
6	10.00	30.00	63.00	83.00	18.80	11.00	32.60	31.20	28.00	33.00	19.00	19.00	47.00	52.00	4.33	5.83
7	11.00	26.00	53.00	83.00	16.80	8.40	28.80	42.00	29.00	29.00	19.00	19.00	48.00	48.00	1.33	3.33
8	14.00	34.00	66.00	90.00	16.60	14.80	42.00	46.80	22.00	30.00	17.00	17.00	39.00	47.00	1.83	4.00

EXPERIMENTAL GROUP

	FUNCTIONAL INDEPENDENCE MEASURE [FIM]				CANADIAN OCCUPATIONAL PERFORMANCE MEASURE [COPM]				FUGYL-MEYER ASSESSMENT						PQRS	
S.NO	PRE FIM ADL	POST FIM ADL	PRE FIM TOTAL	POST FIM TOTAL	PRE COPM PER	PRE COPM SAT	POST COPM PER	POST COPM SAT	PRE FM UE	POST FM UE	PRE FM LE	POST FM LE	PRE FM TOTAL	POST FM TOTAL	PRE PQRS	POST PQRS
1	9	20	54	68	13.80	7.80	34.40	29.40	14	27	12	13	26	40	1.66	4.00
2	26	38	86	113	39.60	28.80	61.00	54.00	36	48	16	23	52	71	4.33	6.83
3	12	24	61	80	16.80	8.40	35.20	40.00	21	31	17	17	38	48	2.00	5.00
4	14	26	63	89	23.40	15.60	40.40	39.00	26	42	19	19	45	61	2.83	5.33
5	11	23	53	75	14.20	8.00	40.00	40.00	31	32	19	19	50	51	1.16	4.16
6	13	31	64	84	21.60	16.40	38.00	41.00	38	38	19	19	57	57	2.50	5.50
7	11	28	53	84	18.60	8.40	37.00	42.00	16	32	13	16	29	48	1.16	4.16
8	17	36	66	94	20.20	16.80	52.20	48.60	14	27	11	14	25	41	4.00	6.63

KMCH ETHICS COMMITTEE
KOVAI MEDICAL CENTER AND HOSPITAL LIMITED

Post Box No. 3209, Avanashi Road, Coimbatore - 641 014. INDIA
✆ : (0422) 4323800, 4323619 Fax : (0422) 4270805
E-mail : ethics@kmchhospitals.com
EC Reg. No : ECR / 112 / Inst / TN / 2013

Ref: EC/AP/552/07/2017
24.07.2017

APPROVED

To

Dr.V. Arul Selvan,
Consultant - Neurologist
Kovai Medical Center and Hospital,
Coimbatore-641 014,
Tamilnadu, India.

Dear Dr. V. Arul Selvan

The proposal entitled **"Effectiveness of COOP Approach in Improving the ADL Performance in Patients with Stroke"** submitted by **Ms. Archana Mohan Kumar** under your supervision was reviewed by the Ethics Committee in its meeting held on **22.07.2017** and permission is granted to carry out the study at **Kovai Medical Center and Hospital Ltd, Coimbatore, India.**

Thanking you,

Yours faithfully,

Dr. P. R. Muthuswamy
Chairman, KMCH Ethics Committee

Dr. P. R. MUTHUSWAMY,
MA.,MBA..FDPM(IIM-A)Ph.D.,
Chairman
Ethics Committee
Kovai Medical Center and Hospital
Avanashi Road,
COIMBATORE 641 014

KMCH ETHICS COMMITTEE
KOVAI MEDICAL CENTER AND HOSPITAL LIMITED

Post Box No. 3209, Avanashi Road, Coimbatore - 641 014. INDIA
✆ : (0422) 4323800, 4323619 Fax : (0422) 4270805
E-mail : ethics@kmchhospitals.com
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KMCH ETHICS COMMITTEE MEMBERS LIST

S. NO	MEMBER NAME	DESIGNATION	REPRESENTATION	DESIGNATION TO THE INSTITUTION	GENDER
1.	Dr.P.R.Muthuswamy	Principal, Dr.N.G.P Arts & Science College	Chairperson	Chairperson, KMCH Ethics Committee	M
2	Dr. Devdas Madhavan	Consultant Urologist	Member Secretary	Consultant Urologist	M
3	Dr. V.Rajamani	Consultant Rheumatologist & Physician	Clinician	Consultant Rheumatologist & Physician	M
4	Dr.K.Senthilkumar	MD-Pharmacology Pharmacologist	Basic Medical Scientist	None	M
5	Dr. A.N.Murugan	Medical Director	Clinician	Medical Director	M
6	Dr. Sangita S.Mehta	Consultant Pathologist	Clinician	Consultant Pathologist	F
7	Dr. S.Madhavi	Principal	Member	Principal, KMCH college of Nursing	F
8	Dr. K.S.G.Arul Kumaran	Professor	Basic Medical Scientist	Professor, KMCH college of Pharmacy	M
9	Dr. S.Thamil Selvi	Social Worker	Social worker	None	F
10	Mr. C.Tamil Selvan	VP-Materials	convener	VP-Materials	M
11	Mr. T.C.Dinamani	Advocate	Legal Expert	Personnel Manager	M
12	Mr.R.Krishnamoorthy	Priest	Theologist	Priest	M
13	Mr. D.Ramanathan	Office Assistant	Lay person	Office Assistant	M

Dr. P. R. Muthuswamy
Chairman, Ethics Committee

Dr. P. R. MUTHUSWAMY,
MA.,MBA..FDPM(IIM-A)Ph.D.,
Chairman
Ethics Committee
Kovai Medical Center and Hospital
Avanashi Road,
COIMBATORE-641 014

KOVAI MEDICAL CENTER AND HOSPITAL LIMITED
NABH Accredited Hospital Excellence in Healthcare
Post Box No. 3209, Avanashi Road, Coimbatore - 641 014. INDIA | Phone : (0422) 4323800
Fax : (0422) 2627782 | Web : www.kmchhospitals.com | CIN No : L85110TZ1985PLC001659

27th July, 2017

Ref: RC/004/2017

To

Dr.V.Arul Selvan,
Consultant - Neurologist
Kovai Medical Center and Hospital,
Coimbatore-641014
Tamilnadu, India.

Dear Dr.V.Arul Selvan,

The dissertation work titled **"Effectiveness of COOP Approach in Improving the ADL Performance in Patients with Stroke"** presented by **Ms. Archana Mohan Kumar,** 2nd year Occupational Therapy under your guidance was discussed at Research Committee held on 22.07.2017 and unanimously decided to give permission to carry on the study at **Kovai Medical Center and Hospital Ltd, Coimbatore**, India.

Thanking you

Yours faithfully,

DR V.KUMARAN
27/07/2017
Head of the Institute/ Dean

Dr. V. KUMARAN MS., MCh.,
DEAN
Kovai Medical Center and Hospital
Coimbatore - 641 014 Tamil Nadu

Enclosure: Composition of Research Committee

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KOVAI MEDICAL CENTER AND HOSPITAL LIMITED
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Post Box No. 3209, Avanashi Road, Coimbatore - 641 014. INDIA | Phone : (0422) 4323800
Fax : (0422) 2627782 | Web : www.kmchhospitals.com | CIN No : L85110TZ1985PLC001659

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S:NO	NAME	DESIGNATION
1	Dr.V.Kumaran	Head of the Institute/Dean
2	Dr.V.Arul Selvan	Guide
3	Dr.Deepak.T	Basic Science Faculty
4	Dr.V.Ganesh	Statistician
5	Dr.Pankaj Mehta	Member
6	Dr.Arul Selvan.V	Member
7	Dr.K.S.Rajkumar	Member
8	Dr.N.Selvarajan	Member
9	Dr.Rajendran.K	Member

DR.V.KUMARAN
27/07/2017

Head of the Institute/Dean

Dr. V. KUMARAN MS., MCh.,
DEAN
Kovai Medical Center and Hospital
Coimbatore - 641 014 Tamil Nadu

EXCELLENCE IN HEALTH CARE 25 1990 - 2015

COIMBATORE PHYSIOTHERAPY FOUNDATION & HOSPITAL

ISO 9001 : 2015 Certified Physiotherapy Hospital

B-39, Hudco Colony, Gandhi Maanagar, Peelamedu, Coimbatore - 641 004.

Ph : 0422-2510500, Cell : 90427 96777, 90437 96777, 99437 96777

Web : www.coimbatorephysio.com

TO WHOMSOEVER IT MAY CONCERN

Respected Sir/Madam,

This is to certify that **MS.Archana Mohan Kumar a student of M. O .T (Master of Occupational Therapy 2nd year), KMCH college of Occupational therapy, Coimbatore**, has successfully done her project on "**Effectiveness of CO-OP approach in improving ADL performance in patients with stroke**" , in our hospital. During this period of her study with us, she was found hardworking and inquisitive.

We wish her every success in life.

Coimbatore Physiotherapy Foundation & Hospital ★ Reg. No. CPDA/2015 CR-H/001

Place: Coimbatore

Date: 15/2/2018

15/2/2018

Dr. V. RAJA SELVAKUMAR, (PT) BPT., MIAP.,
Chief Physiotherapist
Reg. No. [illegible]
Coimbatore Physiotherapy Foundation & Hospital
Signature