International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Effectiveness of Cost Effective Community Based Occupational Therapy Interventions on Functional Independence in CVA: A Quasi Experimental Study

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ABSTRACT

AIM: To study the effectiveness of cost-effective community based occupational therapy interventions on functional independence in CVA.

METHOD: The study consists of 120 samples, who were assigned into a single group. All the samples were assessed for functional independence using STREM, and COPM scale based on the inclusion criteria. All the samples who were selected for the study received home-based occupational therapy using family-mediated interventions. The intervention session was conducted 4 times per week, each session lasting for 45 minutes, for 2 months. All the samples were assessed using STREM and COPM tools before and after intervention. The scores obtained were tabulated and analysed statistically.

RESULT: Overall, the evidence obtained from this study indicates that the intervention produced significant positive outcomes across motor, functional, and satisfaction-related domains. Significant improvements observed in STREAM, COPM Performance, and COPM Satisfaction scores collectively indicate that the intervention not only enhanced motor recovery but also improved participants' capacity to carry out daily functional activities and their satisfaction. These results highlight the therapeutic value of the intervention in promoting functional independence and improving overall rehabilitation outcomes among the participants

CONCLUSION: The study concludes that community-based family mediated occupational therapy interventions improve functional independence of individuals with Cerebrovascular accident. The suggested this method of this intervention to be incorporated as part of regular treatment schedule for Cerebrovascular accident patients So that their quality of life is perceived.

KEY WORDS: Stroke, home based family mediated occupational therapy, Functional Independence

1. INTRODUCTION

Stroke or Cerebrovascular Accident (CVA) is one of the significant neurological disorders that occur due to disruption of blood supply to the brain causing injury to the brain tissues and neurological impairment. It ranks amongst the most common causes of death and disability across the globe and impacts motor, sensory, cognitive, perceptual and communication functions. Depending upon the brain lesion, the stroke patients develop hemiplegia, sensory losses, cognitive impairment, communication impairments, and lack of participation in daily activities (Feigin et al., 2021).

Functional independence is a key objective of stroke rehabilitation and implies the individual's capability to undertake the activities of daily living and take part in domestic, vocational, and social activities without much assistance from others. Unfortunately, the majority of stroke patients still have limitations in self-care, locomotion, and social engagement activities (Langhorne et al., 2011).

Occupational therapy is essential in stroke rehabilitation, as it encourages engagement in meaningful occupation, improves functioning and facilitates participation in life occupations. These include daily activities training, upper limb therapy, modification of the environment, use of assistive devices, caregiver education and community reintegration programs that seek to increase independence and improve quality of life (AOTA, 2020).

Rehabilitation is beneficial, but access to rehabilitation facilities in hospitals is challenging due to financial barriers, transportation issues and lack of rehabilitation resources. Community-based rehabilitation has been developed as an effective method of delivering rehabilitation services in the client's natural environment. Occupational therapy interventions in community-based setting take advantage of local resources, involve caregivers and target functional problems in the environment.

Cost-effective community-based occupational therapy interventions provide a pragmatic approach for sustainable development compared to traditional rehabilitation programs. The approach involves home-based interventions, assisted rehabilitation through caregivers, use of inexpensive assistive devices, and environmental modification to facilitate functional independence without imposing significant financial costs on both the individual and his/her family members (WHO, 2010).

While earlier studies showed the effectiveness of community-based rehabilitation for improved functional results among patients who suffered from strokes, there is inadequate evidence of the effectiveness of cost-effective community-based occupational therapy interventions on functional independence among individuals suffering from Cerebrovascular Accident (CVA). Hence, the current research was carried out to determine the effectiveness of cost-effective community-based occupational therapy interventions on functional independence among individuals with stroke (WHO, 2010; Kumar et al., 2012).

2. RELATED LITERATURE

Strokes are among the most common causes of disability around the world and usually lead to motor, sensory, cognitive, and perceptual deficits, which limit people's independence and participation in daily activities. Functional limitations associated with stroke usually result in a person's inability to engage in activities of daily living, thus, limiting quality of their lives (WHO, 2022; Langhorne et al., 2011).

Occupational therapy is an integral part of stroke rehabilitation and is aimed at promoting functional independence, participation, and involvement in meaningful occupations. One of the most recent developments in the field of occupational therapy for stroke survivors is community-based occupational therapy (CBOT). This type of treatment has become increasingly popular as a means of successful

rehabilitation for patients in countries where there are no possibilities to undergo rehabilitation programs in hospitals (WHO, 2010).

A number of research articles have found evidence about the efficiency of rehabilitation services delivered at home and within communities among stroke survivors. The therapy conducted at home with the help of carers has proved to be equally effective as that carried out in hospitals in improving the functional performance and quality of life of stroke survivors (Nor Azlin Mohd Nordin et al., 2019). Family-based rehabilitation programs also positively impact family functioning and reduce caregiver burden and stress (Saisunee Deepradit et al., 2023).

The cost-effective interventions of occupational therapy in communities, which include ADL training, caregiver assisted therapy, provision of low-cost assistive devices and home modifications, may serve as feasible ways of achieving functional independence (Paolo Candio et al., 2022).

The ability to achieve functional independence is one of the most significant outcomes of stroke rehabilitation which positively impacts quality of life, caregiver burden and level of participation in home and community activities (Lai et al., 2002; Kelly-Hayes et al., 2003). Among the measures of outcomes there may be the Canadian Occupational Performance Measure (COPM) and the Stroke Rehabilitation Assessment of Movement (STREAM), which have proved to have excellent validity and reliability (Carswell et al., 2004; Ahmed et al., 2003).

Whereas there have been past studies that have proven the advantages of community-based rehabilitation and family-based interventions among stroke patients, not much has been written about the cost-effectiveness of community-based occupational therapy interventions on functional independence among CVA patients. The current study was therefore conducted to bridge this gap.

3. AIM & OBJECTIVE OF STUDY

3.1 AIM OF THE STUDY:

To study the effectiveness of cost-effective community based occupational therapy interventions on functional independence in CVA.

3.2 OBJECTIVES:

- To determine the effectiveness of cost-effective community based occupational therapy interventions on functional independence in CVA
- To determine pre-test score on functional independence using The Stroke Rehabilitation Assessment of Movement and The Canadian Occupational Performance Measure
- To determine post test score on functional independence using The Stroke Rehabilitation Assessment of Movement and The Canadian Occupational Performance Measure
- To compare and analysis pre & post test data on functional independence using The Stroke Rehabilitation Assessment of Movement and The Canadian Occupational Performance Measure

4. METHODOLOGY

4.1 Introduction:

This part of the study looks at how we did the research. We talk about how we picked the people for the study and what we looked at to see what happened. We go through the steps we took to get the information what math we used to understand it and how we figured out what it all meant. We also tell you about how we found the people, for the study what we did to them and what we looked at to see if it worked. The

research methodology is important because it helps us understand the results of the research methodology. We used the research methodology to guide our study and make sure we did it right.

4.2 Institutional Human Ethical Approval:

Ethical clearance for conducting the study was secured from the CARE-IHEC, Protocol No. IHEC-I/3824/25.

4.3 Clinical Trial Registration:

Prospective clinical trial registration was obtained prior to experiment from the CTRI (CTRI NO: CTRI/2025/06/108544)

4.4 Study Type:

Quasi Experimental Type

4.5 Study Design:

Single Group Design

4.6 Study Setting:

The samples are collected from the Chettinad Community Hospital, and Community Camp

4.7 Sample Size:

120 sample size

4.8 Sampling Method:

Convenient Purposive sampling

4.9 Study Duration:

2 Months

4.10 Selection Criteria

4.10.1 Inclusion Criteria:

The study included adults (≥20 years) diagnosed with stroke who met the required inclusion criteria, namely

- Diagnosed subjects with stroke
- Minimum 6 months of illness with stroke
- Must have one caregiver / family member living with subject comprehensive individualized rehabilitation
- Capable of independent walking, either unaided or with walking aids
- Caregivers given consent and are able adult to provide directed programs with no or minimum physical injury to self and the patient
- Having caregivers with sound mental condition who is able to understand the demonstrate therapy and able to recreated

4.10.2 Exclusion Criteria:

- Severe comorbid medical or psychiatric conditions
- Any cognitive functional disable
- Residing in long term care facilities

4.11 Outcome Measures:

- The Stroke Rehabilitation Assessment of Movement
- The Canadian Occupation Performance Measure

4.12 Treatment protocol:

Instructions:

- Intervention shall be provided at the patient's home and community setup under the supervision of Occupational Therapist/Caregiver.
- The intervention program will focus on improving functional independence in ADLs, mobility, cognition, community participation, and caregiver support using low-cost and locally available resources.

Duration of session: Approx. 45 minutes per each session

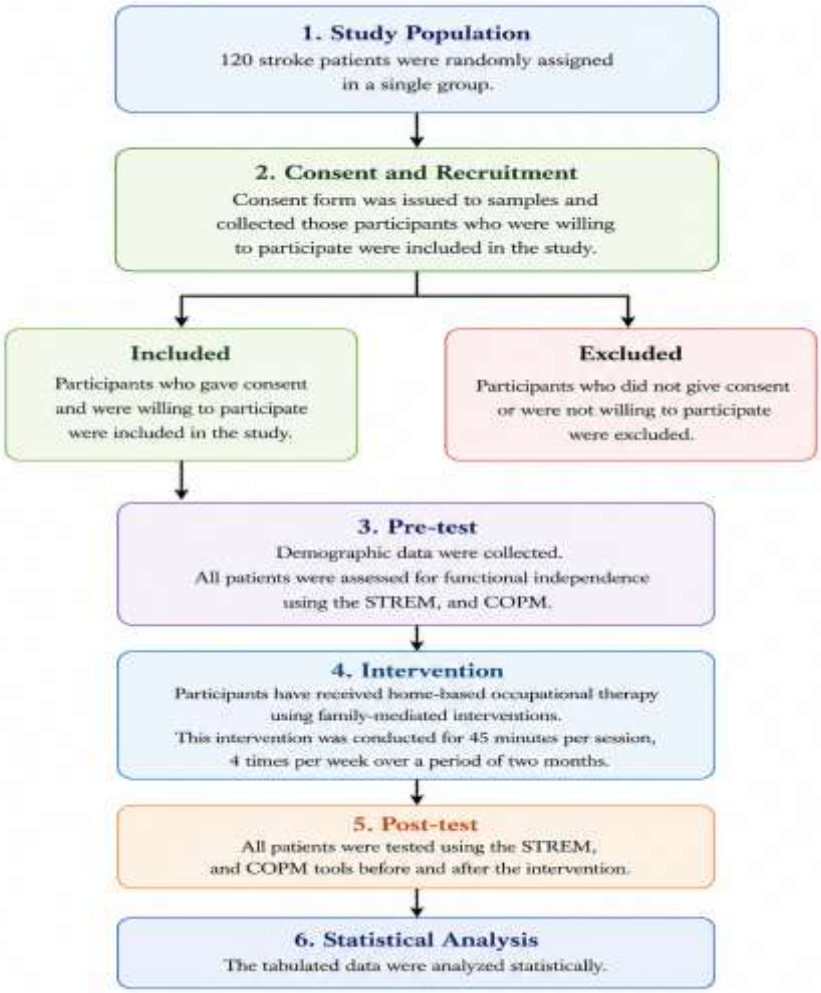
Number of sessions:

- weekly 4 sessions for 2 months.
- Total 24 sessions during study period

Week	Session focus	Intervention Description	Materials/Methods
1	Introduction to Stroke and Role of Caregiver and Assessment & Screening	Functional Independence Measure (FIM), COPM; client-centered goals	Lecture, visual aids, open discussion, and screening
2	Basic ADL Training	Eating, grooming, toileting, brushing dressing using task simplification and adaptive techniques	Low-cost adaptive devices, homemade aids
3	Functional Mobility and Balance	Teach proper Sit-to-stand training, static balance, positioning, transfers, mobility techniques	Chair and mat
4	IADL training	Cooking, cleaning, budgeting training in home setup	Real environment, low-cost materials
5	Cognitive and Perceptual Strategies	Role play, tea cups, memory games, task planning social interaction and support groups	Left & right brain activation activity, building block activity, Memory cards / matching cards, Picture sequencing cards, Puzzle boards and color peg board
6	Cognitive and Perceptual Strategies	Train in modifying home environment for safety	Grab bars, walker, non-slip mats,
7	Community Re	Support caregiver emotional well-	Local environment, real-life

	integration	being and coping and navigating local area, using public transport, community tasks	activities
8	Review and Transition Planning and Reassessment	Reinforce key concepts and plan ongoing support	Q&A, review booklet, action plan

Figure 4.1: Flow chart for main study



5.

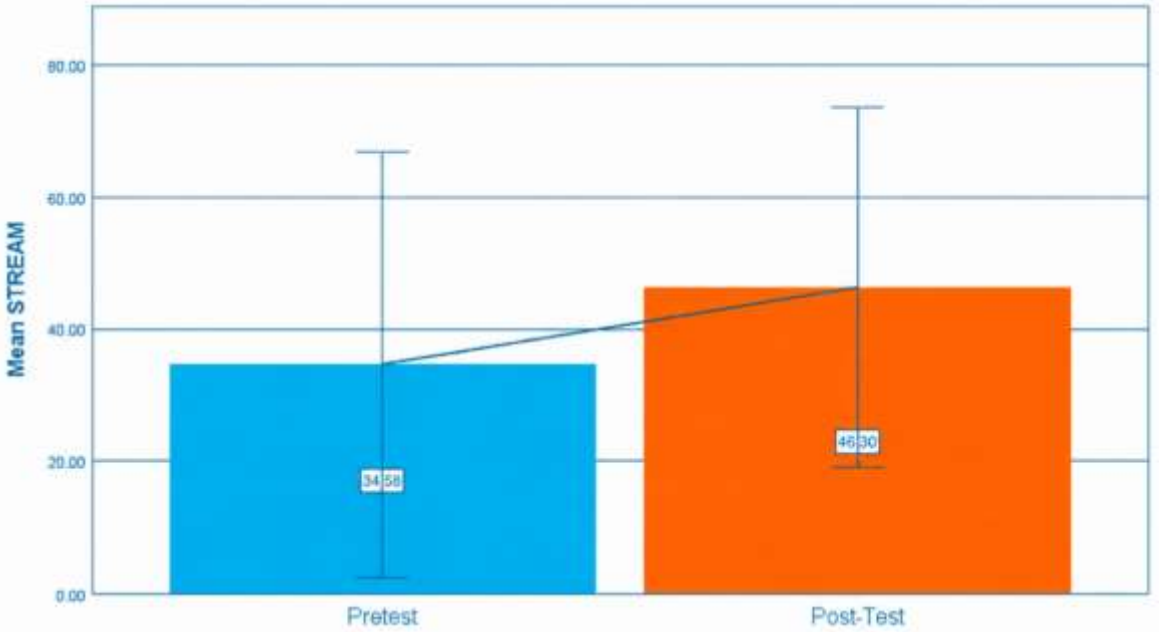
6. RESULT & ANALYSIS

A paired sample *t*-test was carried out to examine effectiveness of the intervention on functional independence among the study participants. The outcomes were evaluated using the STREAM scale and the COPM Performance & Satisfaction subscales. The intervention yielded statistically significant improvements across all parameters, as evidenced by pre–post score comparison.

Table 5.1: Paired sample t-test statistic comparing the pre- and post-intervention changes on the outcomes of STREAM scale

		Mean	± SD	t	*p*
STREAM (n=120)	Pre Treatment	34.5833	±16.08464	-34.912	p < 0.01
	Post Treatment	46.3000	±13.66871		

Figure 5.1: Comparison of STREAM outcomes across time

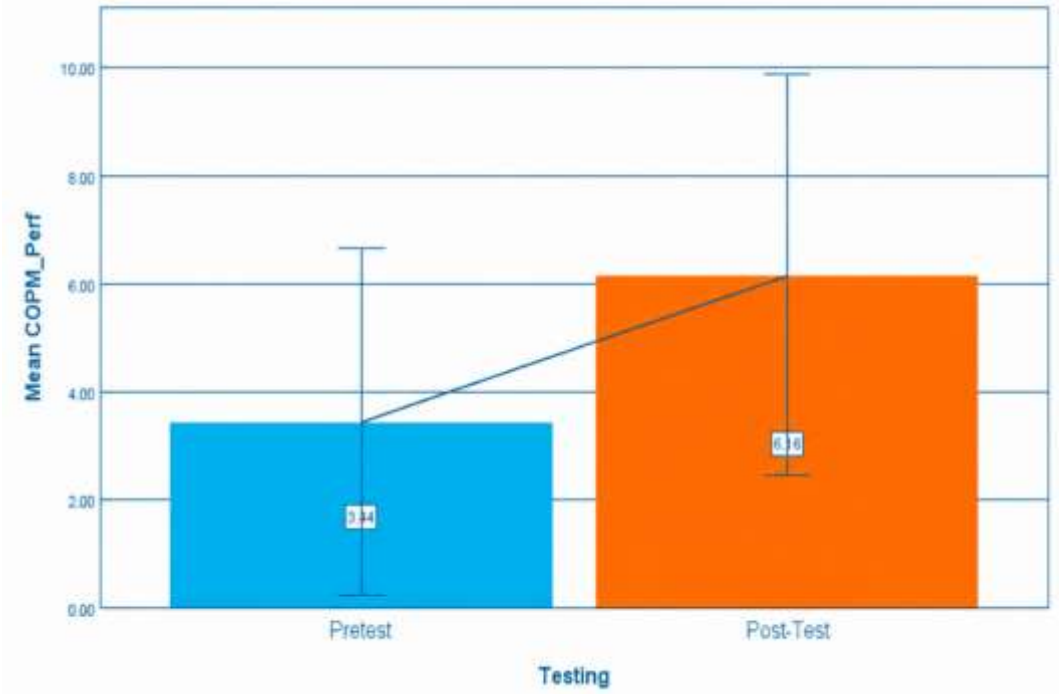


With regard to motor recovery, the STREAM scores showed a marked increase after the intervention. Mean STREAM scores showed a robust improvement, increasing from baseline to post-treatment values of 34.58 ± 16.08 and 46.30 ± 13.67, respectively. The paired sample *t*-test depicted that this improvement was statistically significant, t (119) = -34.91, $p < 0.01$. The increase in STREAM scores indicates a substantial enhancement in movement ability and motor functioning among the participants after receiving the intervention.

Table 5.2: Paired sample t-test statistic comparing the pre- and post-intervention changes on the outcomes of COPM Performance subscale

		Mean	± SD	t	*p*
COPM Performance (n=120)	Pre Treatment	3.4417	±1.60250	-39.263	p < 0.01
	Post Treatment	6.1583	±1.85615		

Figure 5.2: Comparison of COPM Performance subscale outcomes across time

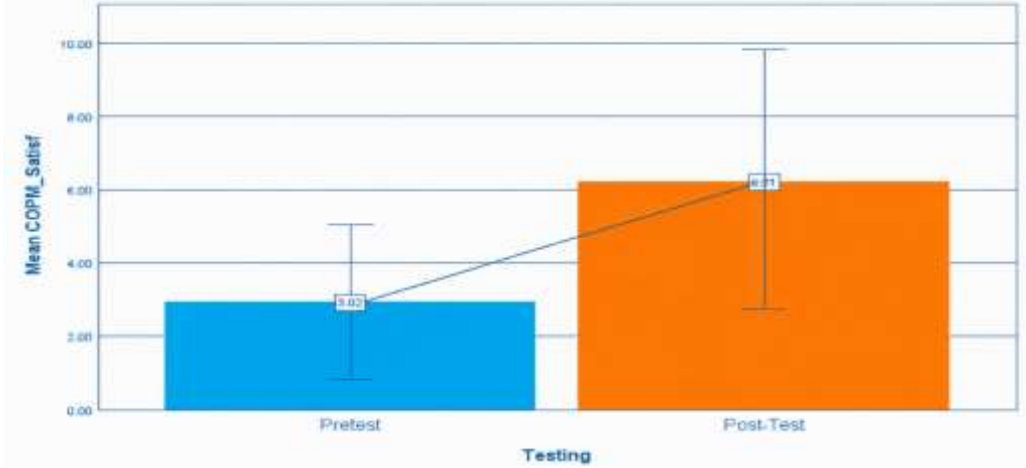


Similarly, occupational performance assessed using the COPM Performance subscale demonstrated significant improvement following the intervention. The mean COPM Performance score rose from 3.44 ± 1.60 at baseline to 6.16 ± 1.86 post-treatment. Statistical analysis showed that the observed improvement was highly significant, t (119) = -39.26, $p < 0.01$. The rise in COPM Performance scores reflects an improvement in the participants perceived ability to perform meaningful and necessary daily activities

Table 5.3: Paired sample t-test statistic comparing the pre- and post-intervention changes on the outcomes of COPM Satisfaction subscale

		Mean	**± SD**	**t**	***p***
COPM Satisfaction (n=120)	Pre Treatment	3.0167	±1.09991	-35.629	p < 0.01
	Post Treatment	6.2083	±1.81449		

Figure 5.3: Comparison of COPM Satisfaction subscale outcomes across time



In addition to improvements in occupational performance, participants also reported significantly greater satisfaction with their performance following the treatment program. The mean COPM Satisfaction score increased from 3.02 ± 1.10 at baseline to 6.21 ± 1.81 after treatment. The paired sample *t*-test demonstrated that this improvement was statistically significant, t (119) = -35.63, $p < 0.01$. The increase in satisfaction scores suggests that participants experienced a meaningful positive change in their confidence and contentment regarding their ability to carry out daily occupational activities.

Table 5.4: Effect sizes (Cohen's d) of the Treatment

Time point	Outcome	Cohen's d	Magnitude of Change
Pre and Post Intervention	STREAM	3.19	extremely large effect size
Pre & Post Intervention	COPM Performance Scale	3.58	extremely large effect size
Pre & Post Intervention	COPM Satisfaction Scale	3.25	extremely large effect size

Effect size analysis was executed to examine the magnitude of change between the pre- and post-intervention assessments across the study outcomes. The results showed big differences for all the things we looked at. For the STREAM scale we got a Cohen's d value of 3.19. This means the difference between the scores before and after the intervention was really big. We saw something with the COPM Performance subscale, which had a Cohen's d value of 3.58. This also showed a big difference. The COPM Satisfaction subscale had a Cohen's d value of 3.25. This showed a big difference between the scores before and after the intervention too. The STREAM scale and the COPM scales all showed effects. The results, for the STREAM scale and the COPM Performance subscale and the COPM Satisfaction subscale were all very similar in that they all showed differences.

Overall, this study's findings show that the intervention had good results in several areas. The intervention helped with motor skills, daily activities and how satisfied participants were. People did better in STREAM, COPM Performance and COPM Satisfaction scores. This means the intervention helped with motor recovery and also helped participants do their tasks better. It also made them happier with what they could do. These results are news for the intervention as it helps people become more independent and improves their rehabilitation. The study found that the intervention was helpful in promoting independence and improving rehabilitation results, for participants.

6. DISCUSSION & CONCLUISION

6.1 Discussion

The study we did looked at how occupational therapy at home works when family members help. We studied 120 stroke patients. We used two tools, the STREM and COPM to see how they were doing before and after therapy. We found out that having a set plan for rehab at home really helps stroke patients do more on their own and do activities better. The therapy helped patients with stroke get better at doing things by themselves. Home-based rehab seems to work for stroke patients. The results showed patients could do things on their own after therapy. This kind of therapy with help from family appears to be good for people who have had a stroke. The study results are news for stroke patients. They can get better with the help, at home. Stroke often leads to cognitive and functional problems that make everyday tasks harder.

In our study people took part in a two-month program with 45-minute therapy sessions four times a week. They showed improvement after the program, which suggests that regular occupational therapy at home can really help with recovery and getting involved in activities. This shows that occupational therapy, done regularly at home helps people with stroke get better and participate more in activities, like self-care. One big strength of this study was using interventions that involved the patient's family. The family likely helped patients stay motivated stick to their therapy and keep doing rehab activities even when they weren't in treatment sessions. They provided support helped with exercises and reminded them of therapeutic strategies. This extra help may have sped up their recovery. The results show that getting family members involved is really important, in helping stroke patients recover. The use of home-based therapy has a lot of things about it. When people get therapy at home it is more about the things they do every day. This makes it more useful and interesting to them. People usually feel better and surer of themselves when they practice things at home of in a hospital or clinic. Home-based therapy can also make things easier for people who have trouble getting around and can help them save money. Home-based programs are very helpful for patients with mobility limitations. Home-based therapy is an option, for people who want to get better at home. The assessments that were done before and after the treatment using COPM tools helped to see how well people could do things on their own and how well they could do everyday activities. When people got better in these areas it showed that the treatment did not just help them move and do things better but helped them feel more confident and happier with what they could do every day. This shows that occupational therapy is really helpful, in making people better in ways including how they feel physically and emotionally when they are recovering from a stroke. Occupational therapy helps with the emotional parts of recovering from a stroke. The study we are doing now is showing the thing that other studies have shown before. If people do tasks over and over that are meant to help them and their family is supportive, they can get better after having a stroke. It is very important to keep doing these tasks and to really participate in them. This helps the brain to change and get better. It helps people to move again. So, the schedule we used in this study, where we had a plan and stuck to it probably helped the people, in the study to get better. Despite the results we should think about some limitations. The study only used one group of people. Did not have a comparison group, which makes it hard to know how the results would compare to other treatments or if people would get better on their own. The study only lasted two months. There was no follow-up to see what happened to the participants after that. To learn more about how family-based home occupational therapy works over time future studies should consider using a controlled design studying more people and checking in with participants for a longer period. The study had some constraints and these limitations should be addressed in research on family-mediated home-based occupational therapy. The results of this study on family-mediated home-based therapy are promising, but more research, with a stronger design is needed. The study had some results but there are some things to think about. Family-mediated home-based occupational therapy was tested with one group of people. There was no other group to compare it to. This makes it hard to see if it is better than types of treatment or if people would have gotten better on their own. The study also did not last long it was only two months and we do not know what happened to the people after that. In the future we should do studies that compare family-mediated home-based therapy to other types of treatment and we should follow the people for a longer time to see if family-mediated home-based occupational therapy really works in the long term. Family-mediated home-based occupational therapy seems to be a way to help stroke patients do things on their own and take care of themselves. This type of therapy can be very helpful in places where people do not have access to hospitals or other places that can provide therapy. Family-mediated

home-based occupational therapy can be a way to help people get better at home and it can be very useful, in areas where resources are limited. The new study shows that the things they tried really worked. People got better at moving and doing things. They were also happier with how things were going. The study looked at how people could move and do things and how happy they were with their situation. The intervention had an impact on these things. The study found results, in many areas, including how well people could move and do things and how happy they were. Significant improvements observed in STREAM, COPM Performance, and COPM Satisfaction scores collectively indicate that the intervention not only enhanced motor recovery but also improved participants' ability to engage in daily occupations and increased their satisfaction with their performance. These findings suggest that the home-based occupational therapy program with family-mediated interventions was effective in promoting functional independence and improving overall rehabilitation outcomes among stroke patients. The observed improvement in STREAM scores reflects enhancement in motor recovery and functional movement abilities following the intervention. Similarly, the increase in COPM Performance scores indicates better participation and performance in meaningful daily activities, while improved COPM Satisfaction scores demonstrate greater confidence and satisfaction among participants regarding their occupational performance. The improvements that we saw can be because of the practice that people did during the intervention sessions. They did things that they needed to do. The family members were also involved in the rehabilitation process. They were really active. Helped out. The rehabilitation process was made better because of this. The improvements are really because of the intervention sessions and the help, from family members. The family-mediated approach used in this study probably helped people stick to their treatment and feel motivated to keep doing their therapy at home. When people get rehabilitation in their homes it is more helpful because they can practice doing everyday things in a real setting. This makes it easier for them to do things on their own when they need to. So, it seems like this kind of help supports stroke survivors in two ways: it helps them get better physically and it also helps them feel better emotionally. The study we did matches what other researchers have found about helping people recover from stroke at home with the support of their family. This approach to therapy seems to work well especially in areas where resources are limited. It helps people get better after a stroke. The study had some limitations. The study only looked at one group of people. Did not compare them to another group. This makes it hard to say for sure what caused the improvements we saw. Also, we did not check in with the people over a period to see if they kept getting better. We think future studies should: 1. Include a control group to compare to the people getting the therapy. 2. Look at people to see if the results are the same for everyone. 3. Check in with people over a period to see if the improvements last. This will help us know for sure if this approach really works. The home-based rehabilitation and caregiver-supported interventions are effective. Family-assisted occupational therapy is an option for people recovering from stroke. It is accessible and beneficial, in community and resource-limited settings. The research shows that doing therapy at home is really helpful for people who have had a stroke. Home-based occupational therapy uses family-mediated interventions. This means that family members help with the therapy. It can really improve motor recovery, which's the ability to move and do things. It also improves performance, which is the ability to take care of yourself and do everyday tasks. People who do this kind of therapy are also more satisfied with their lives. They become more independent. Can do things on their own which is a big plus for stroke patients. Occupational therapy at home is very beneficial, for stroke patients.

6.2 conclusion

The study concludes that community-based family-mediated occupational therapy interventions signific-

antly improve functional independence, motor recovery, occupational performance, and satisfaction among individuals with Cerebrovascular Accident. The therapeutic approach exhibited economic efficiency, accessible, and beneficial in facilitating rehabilitation within the home environment. Therefore, incorporating family-mediated home-based occupational therapy as a part of regular rehabilitation management may augment the QOF & overall recovery impacts of individuals with CVA.

The study concludes that community-based family mediated occupational therapy interventions improve functional independence of individuals with Cerebrovascular accident. The suggested this method of this intervention to be incorporated as part of regular treatment schedule for Cerebrovascular accident patients So that their quality of life is perceived.

7. LIMITATION & RECOMMENDATION

7.1 Limitations of the Study

`There are several limitations to this study that need to be taken into account when analyzing the results. This research was done through the use of a single-group quasi-experimental design that does not have a control group. This might affect the quality of the methodology used in this research and limit the ability to associate the results obtained entirely with the intervention. Moreover, the number of participants involved in the study was small (only 120 stroke patients). As a result, the findings may not be generalizable to the whole stroke population. Besides, the intervention only lasted for two months; hence, the period used might not be enough to evaluate the long-term sustainability of the results. There were no follow-up assessments performed after the intervention; thus, it is difficult to ascertain whether the improvements attained were sustained over time. In addition, the study only evaluated the effects of family-based home occupational therapy and did not compare it with other methods of rehabilitation. Variability in caregiver involvement and family support may also have affected the results. Finally, socioeconomic factors that may influence rehabilitation outcomes were not explored. Finally, the study relied primarily on the STREAM and COPM as outcome measures; incorporating additional standardized assessment tools could have provided a more comprehensive evaluation of motor, cognitive, and functional recovery.

7.2 Recommendations of the Study

Further research efforts could focus on implementing a randomized controlled trial design using suitable control groups in order to increase the reliability of the results generated by the research. Large sample size should be adopted in future efforts in order to ensure the applicability of the findings on other stroke patients. Future research could investigate how the presence of family in stroke rehabilitation affects the mental and psychological wellbeing of the stroke victims. The implementation of effective training programs for caregivers should be considered in order to increase their skills and efficiency when it comes to rehabilitation of patients. Future studies could also be conducted in different geographical areas and communities in order to investigate the applicability of the intervention program in such settings. Adoption of other standardized tests for evaluation of the patient's progress should be encouraged. Health care providers should encourage the participation of families in rehabilitation programs for stroke patients. Home-based occupational therapy for stroke patients can also be considered.

ACKNOWLEDGMENT

I sincerely thank almighty god, my family, friends, participants, and everyone who supported and contributed to the successful completion of this dissertation.

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