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Effectiveness of Occupation Based Activity Training on Functional Task Performance of Upper Extremity and Quality of Life among individuals with Hemiplegic Stroke

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Abstract

Aim: The study aims to determine the effectiveness of Occupation Based Activity Training on Functional Task Performance of Upper Extremity and Quality of Life among individuals with Hemiplegic Stroke.

Materials and Methods: A single-blinded RCT was performed at Chettinad Hospital and Research Institute, Chennai, to evaluate the effectiveness of Occupation-Based Activity Training in individuals with hemiplegic stroke. Ethical approval (IHEC-I/3800/25) and CTRI registration (CTRI/2025/07/090116) were obtained. Sixty participants aged 40–65 years having chronic hemiplegic stroke were randomly assigned to experimental or control groups. Outcomes were assessed using the CAHAI-7 and SS-QOL scales before and after intervention. The experimental group received Occupation-Based Activity Training for 45–60 minutes, five times in a week for four weeks, while usual care was received by control group. Data was analysed using SPSS version 32.0.

Result: The Experimental Group demonstrated significantly greater improvements in upper extremity functional task performance and quality of life compared to the Control Group. Mean CAHAI-7 scores improved from 19.16 ± 3.60 to 28.9 ± 4.74, with a mean improvement of 9.73 ± 2.70 points, while mean SS-QOL scores improved from 113.53 ± 15.13 to 151.26 ± 15.58, with a mean improvement of 37.73 ± 9.22 points. In contrast, the Control Group showed smaller improvements in CAHAI-7 (4 ± 1.78) and SS-QOL (12.26 ± 6.07) scores. Statistical analysis revealed significant within-group and between-group differences ($p < 0.001$), indicating the effectiveness of Occupation-Based Activity Training in individuals with hemiplegic stroke.

Conclusion: The findings of the study indicate that Occupation-Based Activity Training is an effective intervention for improving upper extremity functional task performance and quality of life among individuals with hemiplegic stroke. Participants who received the intervention demonstrated significantly greater improvements compared to those receiving usual treatment. The meaningful, client-centered, and task-specific nature of the intervention may have facilitated motor recovery, functional

independence, and active participation in daily activities. These findings support the application of occupation-based techniques in stroke rehabilitation programs to promote functional outcomes and quality of life in general.

Keywords: Hemiplegic Stroke, Occupation-Based Activity Training, Functional Task Performance, Chedoke Arm and Hand Inventory-7, Stroke-Specific Quality of Life, Occupational Therapy.

1 Introduction

Stroke is one of the leading causes of mortality and long-term disability worldwide, resulting from an interruption of cerebral blood flow that causes neuronal damage and neurological deficits (Feigin et al., 2021). Survivors frequently experience impairments in motor, sensory, cognitive, and communication functions, which significantly affect their ability to perform activities of daily living (ADLs) and participate in meaningful life roles (Sun et al., 2023). In India, the incidence of stroke is estimated to range from 119 to 152 per 100,000 population annually, with hemiplegia being one of the most common disabling consequences (Pandian & Sudhan, 2013) [1,2,3]

Upper extremity dysfunction is a major concern among individuals with hemiplegic stroke. Approximately 70–80% of stroke survivors experience upper limb impairments during the acute phase, and many continue to have residual deficits despite rehabilitation (Langhorne et al., 2011). Impaired motor control, muscle weakness, abnormal movement patterns, and sensory deficits interfere with functional activities such as reaching, grasping, feeding, dressing, grooming, and object manipulation (Winstein et al., 2016). These limitations often reduce independence, increase caregiver dependence, and negatively affect participation in social and occupational roles (Wolf et al., 2006) [4,5,6]

Recovery of upper extremity function is closely associated with neuroplasticity and task-specific motor learning. Contemporary rehabilitation approaches emphasize active participation in meaningful and goal-directed activities to promote functional recovery (Kleim & Jones, 2008). Occupation-Based Activity Training (OBAT), a core intervention approach in occupational therapy, utilizes purposeful and meaningful occupations to facilitate motor relearning, enhance engagement, and improve participation in everyday life (AOTA, 2020). By integrating therapeutic activities within real-life contexts, OBAT promotes functional use of the affected limb and supports the transfer of learned skills to daily routines (Trombly & Radomski, 2014) [7,8,9]

Beyond physical recovery, quality of life (QOL) has become a critical outcome in stroke rehabilitation. Persistent upper extremity dysfunction can adversely affect self-care, productivity, leisure participation, emotional well-being, and social relationships (Carod-Artal & Egido, 2009). Research suggests that improvements in functional independence are associated with enhanced confidence, greater community participation, and better overall quality of life (Wolf et al., 2006; Langhorne et al., 2011). Therefore, rehabilitation interventions should address not only motor impairments but also functional performance and psychosocial well-being [10, 6,4]

Although occupation-based and task-oriented interventions have demonstrated promising outcomes in stroke rehabilitation, evidence regarding the effectiveness of Occupation-Based Activity Training on upper extremity functional task performance and quality of life among individuals with hemiplegic stroke remains limited. Furthermore, variations in intervention protocols and outcome measures have restricted the generalizability of existing findings (Winstein et al., 2016). Therefore, the present study

aimed to investigate the effectiveness of Occupation-Based Activity Training on upper extremity functional task performance and quality of life among individuals with hemiplegic stroke [5]

2 Related Literature

Stroke is a major cause of long-term disability and frequently results in hemiplegia, leading to impaired upper extremity function, reduced independence in activities of daily living, and decreased quality of life (Feigin et al., 2021; Langhorne et al., 2011). Upper limb dysfunction, including weakness, impaired co-ordination, and reduced motor control, significantly limits functional task performance and participation in meaningful occupations (Winstein et al., 2016) [1,4,5]

Research suggests that recovery of upper extremity function is enhanced through repetitive, task-specific, and meaningful activities that promote neuroplasticity and motor relearning (Kleim & Jones, 2008). Contemporary rehabilitation approaches emphasize functional and occupation-based interventions because they facilitate the transfer of learned skills to real-life situations and improve engagement in therapy (Trombly & Radomski, 2014). Occupation-Based Activity Training (OBAT) is a client-centered approach that uses meaningful occupations to improve functional performance and participation. Previous studies have reported positive effects of occupation-based and task-oriented interventions on upper extremity function, activities of daily living, and overall participation among individuals with stroke (Wolf et al., 2015) [7,9,11]

Quality of life is an important outcome in stroke rehabilitation and is strongly associated with functional independence and occupational participation (Carod-Artal & Egido, 2009). Although evidence supports occupation-based interventions in stroke rehabilitation, limited research has specifically examined the effectiveness of Occupation-Based Activity Training on upper extremity functional task performance and quality of life among individuals with hemiplegic stroke. Therefore, the present study was undertaken to address this gap [10]

3 Aim & Objective of study

3.1 Aim of the study:

To study the Effectiveness of Occupation Based Activity Training on Functional Task Performance of Upper Extremity and Quality of Life among individuals with Hemiplegic Stroke.

3.2 Objectives:

- To find the pre-test value of the control group using CAHAI-7 and SS-QOL scale.
- To find the post-test value of the control group using CAHAI-7 and SS-QOL scale.
- To find the pre-test value of the experimental group using CAHAI-7 and SS-QOL scale.
- To find the post-test value of the experimental group using CAHAI-7 and SS-QOL scale.
- To compare the pre-test and post-test value of the control group.
- To compare the pre-test and post-test value of the experimental group.
- To compare the post-test values of the experimental group and the control group.
- To study the demographical variables.

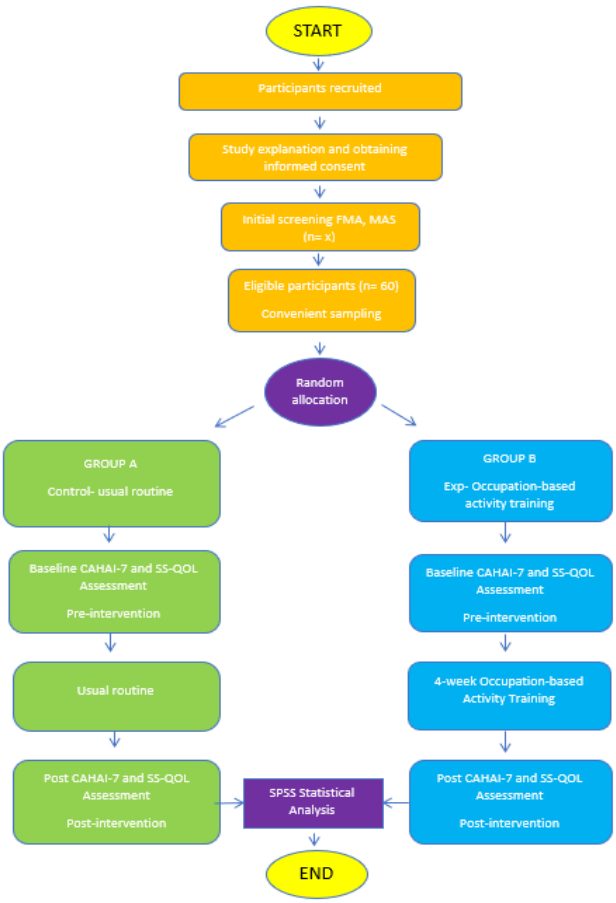
4 Methodology

A randomized controlled trial was conducted at Chettinad Hospital and Research Institute, Chennai, after obtaining Institutional Human Ethics Committee approval (IHEC-I/3800/25) and Clinical Trials Registry–India registration (CTRI/2025/07/090116). A sample size of 60 subjects aged between 40–65 years

were recruited using convenience sampling and randomly allocated into an experimental group (n = 30) and a control group (n = 30). Participants met predefined eligibility criteria, including a post-stroke duration of more than three months and residual upper extremity impairment.

The experimental group received Occupation-Based Activity Training (OBAT), consisting of individualized, meaningful activities related to self-care, domestic, leisure, and community participation. Sessions were conducted for 45–60 minutes, five times per week, for four weeks. The control group continued with their usual routine. Participants were blinded to group allocation. Upper extremity functional task performance and quality of life were assessed using the Chedoke Arm and Hand Activity Inventory (CAHAI-7) and the Stroke-Specific Quality of Life Scale (SS-QOL), respectively, at baseline and after four weeks of intervention. Data were analysed using SPSS version 32.0, with statistical significance set at $p < 0.05$.

4.1. Flow chart of study:



5 Result and Analysis

The results were analyzed to determine the effectiveness of Occupation-Based Activity Training (OBAT) on upper extremity functional task performance and quality of life among individuals with hemiplegic stroke.

Demographical Variables (Age, Gender)

Table 5.1 Distribution of Demographical Variables Among Experimental and Control Groups

Demographic Variable	Control Group (n = 30)	Experimental Group (n = 30)
Age (years) Mean ± SD	50.3 ± 7.345	51.13 ± 8.31

Female (n, %)	13 (43.3%)	12 (40%)
Male (n, %)	17 (56.65%)	18 (60%)

There was no statistically significant difference between the experimental and control groups in terms of age and gender distribution ($p > 0.05$), indicating that both groups were comparable at baseline.

Within Group Analysis

Table 5.2. Within-Group Comparison of CAHAI-7 and SS-QOL Scores

Group	Measure	Pre Mean± SD	Post Mean± SD	Mean difference
Control	**CAHAI-7**	20.96 ± 3.79	24.96 ± 3.92	4
	SS-QOL	118.1 ± 12.88	130.36 ± 12.98	12.26
Experimental	**CAHAI-7**	19.16 ± 3.60	28.9 ± 4.74	9.73
	SS-QOL	113.53 ± 15.13	151.26 ± 15.58	37.73

The experimental group showed a large and statistically significant improvement in both CAHAI-7 and SS-QOL scores ($p < 0.001$), whereas the control group demonstrated only minimal improvement despite statistical significance.

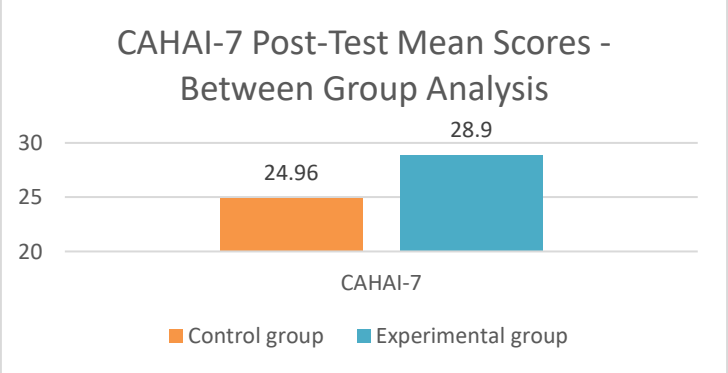
Within-Group and Between-Group Differences

Table 5.3 Analysis of Within-Group and Between-Group Differences in CAHAI-7 and SS-QOL Scores

Measure	Group	Test	Mean Difference	t/z value	p-value
CAHAI-7	**Control**	Paired t-test	4	-12.04	< 0.001
	Experimental	Paired t-test	9.73	-19.36	< 0.001
	Between Groups (Post)	Independent t-test	-3.933	-3.46	0.001
SS-QOL	**Control**	Paired t-test	12.26	-10.87	< 0.001
	Experimental	Paired t-test	37.73	-22.03	< 0.001
	Between Groups (Post)	Independent t-test	-20.90	-5.548	< 0.001

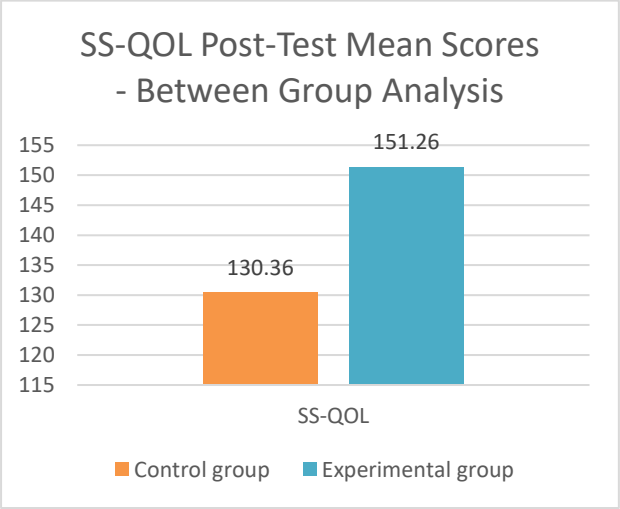
The experimental group demonstrated substantially greater improvements in upper extremity functional task performance and quality of life compared to the control group, indicating a strong positive impact of Occupation-Based Activity Training on stroke rehabilitation outcomes.

Figure 5.1 Comparison of Post-test CAHAI-7 Scores Between Control and Experimental Groups



The graph shows comparable baseline CAHAI-7 scores between the groups, with the experimental group demonstrating greater post-test improvement than the control group following the intervention.

Figure 5.2 Comparison of Post-test SS-QOL Scores Between Control and Experimental Groups



The graph illustrates greater improvement in SS-QOL scores in the experimental group compared to the control group after the intervention.

6 Discussion & Conclusion

The present study evaluated the effectiveness of Occupation-Based Activity Training (OBAT) on upper extremity functional task performance and quality of life among individuals with hemiplegic stroke. Participants in the experimental group demonstrated greater improvements in both CAHAI-7 and SS-QOL scores compared to the control group following four weeks of intervention.

CAHAI-7 scores improved from 19.16 ± 3.60 to 28.9 ± 4.74 in the experimental group, compared to 20.96 ± 3.79 to 24.96 ± 3.92 in the control group. Similarly, SS-QOL scores increased from 113.53 ± 15.13 to 151.26 ± 15.58 in the experimental group, whereas the control group improved from 118.1 ± 12.88 to 130.36 ± 12.98. Between-group analysis showed significant differences in CAHAI-7 ($p = 0.001$) and SS-QOL ($p < 0.001$) scores.

These findings suggest that Occupation-Based Activity Training enhances functional recovery and quality of life by promoting engagement in meaningful and task-specific activities. The results support the use of occupation-based interventions as an effective rehabilitation approach for improving upper extremity function, participation, and overall well-being among individuals with hemiplegic stroke.

7 Limitation and Future Recommendations

The present study was limited by its relatively small sample size, single-center recruitment, short intervention duration, and lack of follow-up assessment, which may affect the generalizability and long-term applicability of the findings. Additionally, the study focused only on upper extremity functional task performance and quality of life, without examining other important outcomes such as occupational participation, community reintegration, psychological well-being, and caregiver burden. Future studies should include larger multicenter samples, longer intervention periods, and follow-up assessments to evaluate the sustainability of treatment effects. Further research is also recommended to investigate the impact of Occupation-Based Activity Training across different stages of stroke recovery and on broader

rehabilitation outcomes.

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