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Building Confidence through Repetition: Effect of Home-Based Task-Oriented Training on Functional Task Repetition and Stroke Self-Efficacy in Chronic Stroke Survivors

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Abstract:

- ***Background:***

Despite improvements in motor function following stroke rehabilitation, many chronic stroke survivors continue to experience reduced confidence in performing everyday activities independently. Task-oriented training emphasizes repetitive practice of meaningful functional activities and may improve not only physical performance but also patients' belief in their own functional abilities. However, evidence regarding its influence on functional task repetition and stroke self-efficacy in a home-based setting remains limited.

- ***Objective:***

To investigate the effect of a four-week home-based task-oriented training program on functional task repetition and stroke self-efficacy in individuals with chronic stroke.

- ***Methods:***

A single-group pre–post interventional study was conducted involving fifteen chronic stroke survivors. Participants underwent home-based task-oriented training for 30 minutes per session, five days per week for four weeks (20 sessions). Functional task repetition was evaluated using the number of repetitions completed during Sit-to-Stand, Right Forward Step-Up, Left Forward Step-Up, Right Side Step-Up, and Left Side Step-Up tasks. Stroke self-efficacy was assessed using the Stroke Self-Efficacy Questionnaire (SSEQ). Data normality was assessed using the Shapiro–Wilk test. As the data were not normally distributed, the Wilcoxon Signed-Rank Test was used for statistical analysis with the level of significance set at $p < 0.05$.

- ***Results:***

Following the intervention, participants demonstrated significant improvements in all functional repetition tasks, with large effect sizes observed across Sit-to-Stand and step-up activities ($p < 0.05$). Significant improvements were also found in several domains of the Stroke Self-Efficacy Questionnaire, particularly those related to performing functional activities independently, while a few items showed no statistically significant change.

- ***Conclusion:***

Home-based task-oriented training significantly improved functional task repetition and enhanced self-efficacy in chronic stroke survivors.

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Keywords: *Chronic Stroke, Functional Repetition, Home-Based Rehabilitation, Neuro-Rehabilitation Stroke Self-Efficacy, Task-Oriented Training.*

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I. INTRODUCTION

Recovery after stroke often continues long after discharge from inpatient rehabilitation because many survivors experience persistent limitations in mobility, balance, and performance of activities of daily living that require ongoing rehabilitation. Many individuals with chronic stroke are unable to attend regular hospital-based rehabilitation due to transportation difficulties, financial constraints, limited availability of rehabilitation services, caregiver dependence, and geographical barriers. Consequently, home-based rehabilitation has become an important strategy for providing continued rehabilitation while reducing the burden associated with repeated hospital visits.[2] Delivering rehabilitation within the patient's own home enables practice in a familiar environment, promotes greater participation in daily activities, and facilitates the integration of therapeutic gains into real-life situations.

Despite improvements in physical function, many stroke survivors remain reluctant to perform everyday activities independently because they lack confidence in their physical abilities. Fear of falling, previous unsuccessful movement experiences, and uncertainty regarding the use of the affected limb often reduce participation in functional activities despite adequate motor recovery.

This reduced confidence is commonly described as self-efficacy, which refers to an individual's belief in their capability to successfully organize and perform behaviors necessary to achieve a desired outcome. Higher self-efficacy has been associated with better adherence to rehabilitation, increased participation in physical activity, greater independence in activities of daily living, and improved quality of life among stroke survivors.[4] Therefore, effective stroke rehabilitation should address not only physical impairments but also psychological factors such as confidence, as both contribute significantly to successful functional recovery and long-term independence.[1]

Several rehabilitation approaches have been incorporated into home-based stroke rehabilitation, including conventional therapeutic exercises, muscle strengthening, balance training, aerobic exercise, constraint-induced movement therapy, and task-oriented training.[1] Each rehabilitation approach addresses different aspects of post-stroke recovery; however, interventions that closely resemble everyday functional activities are more likely to improve real-world performance and independence. Among these approaches, task-oriented training (TOT) has become one of the most widely recommended rehabilitation strategies because it emphasizes practicing meaningful, goal-directed tasks that are directly related to activities of daily living.

Task-oriented training is founded on the principles of motor learning, which emphasize that repeated practice of meaningful tasks enhances skill acquisition, movement efficiency, and long-term retention of motor performance. The principles of experience-dependent neuroplasticity further suggest that repetitive, task-specific practice promotes adaptive reorganization within the central nervous system, thereby facilitating recovery of motor function after stroke.

Task-oriented training is particularly suitable for home-based rehabilitation because most functional tasks require minimal equipment, can be adapted to the patient's ability, and can be practiced safely within the home environment under appropriate supervision.[3] Practicing functional activities within the patient's own environment also enhances contextual learning, allowing newly acquired motor skills to be transferred more effectively into everyday life.[4,8] Therefore, Task-oriented training provides a practical rehabilitation approach and an ideal intervention for individuals with chronic stroke undergoing home-based rehabilitation.

Among lower-limb functional tasks, sit-to-stand and step-up exercises are commonly used because they represent essential daily activities required for transfers, stair negotiation, and independent mobility. Furthermore, sit-to-stand and step-up exercises require minimal equipment, can be performed safely at home, and are easily progressed by increasing the number of repetitions.[3] Repeated successful task practice also provides mastery experiences**,** which are recognized as the strongest source of self-efficacy and may improve confidence in performing functional activities independently.[6]

Although task-oriented training has demonstrated positive effects on gait, balance, and functional mobility after stroke, limited evidence has explored its influence on functional task repetition together with stroke self-efficacy in a home-based rehabilitation setting.[1,8] The present study was conducted during the COVID-19 lockdown period, when direct access to physiotherapy services and regular supervision by physiotherapists were considerably restricted. Therefore, implementation of a structured home-based task-oriented training program provided an alternative means of maintaining regular functional practice in the absence of frequent face-to-face physiotherapy supervision.Therefore, the present study aimed to investigate the effect of Home-based task-oriented training program on functional task repetition and stroke self-efficacy in individuals with chronic stroke.

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II. METHODOLOGY & MATERIALS

➢ *Study Design:*

A Pre- Post Single group study design using purposive sampling was conducted to investigate the effects of Home-based task-oriented training on functional task repetition and stroke self-efficacy in chronic stroke Survivors. Ethic's approval was obtained for study by Institutional Review Board with proposal number – PTC/IEC/45/2020-21.

➢ *Participants:*

n=15 individuals with chronic stroke were recruited from OPD of Neuro-Rehabilitation Department of S.B.B College of physiotherapy from various OPDs of VS general hospital and SVP hospital, Ahmedabad and other Private clinics, UHC and Communities of Ahmedabad. Inclusion criteria were included a confirmed diagnosis of stroke with age between 40-65 years, Duration of Stroke ≥ 6 months, Mini-Mental State Examination score ≥ 24, Berg Balance Scale with Low fall risk and who is able to do household walking independently or with assistive device. Patients with Unstable Medical condition, History of >1 fall in past 1month, patients with other neurological conditions, Auditory or Visual perceptual deficit, Patient with fixed contracture of any lower limb muscle were excluded.

➢ *Materials:*

Chair, Stepper, Paper, Pencil, Pen, Diary, SSEQ questionnaire The Home-based task-oriented training protocol followed from Dave YS et al, (2026).[9] Briefly, participants performed five functional lower-limb tasks consisting of sit-to-stand while holding an object, forward step-up (affected limb leading), forward step-up (unaffected limb leading), lateral step-up (affected side), and lateral step-up (unaffected side). Each activity was performed for one minute followed by one minute of rest. Three circuits were completed during each session, resulting in approximately 30 minutes of training (15 minutes of active exercise and 15 minutes of rest).

➢ *Outcome Measure:*

To assess functional task repetitions a structured Home Exercise Repetition Diary was specifically developed to monitor participants' adherence to the home-based task-oriented training program and to record the number of repetitions completed during each exercise session. The diary was prepared in the local Gujarati language to facilitate understanding and independent use by the participants.

The diary consisted of separate recording sheets for each of the five functional training tasks, namely sit-to-stand while holding an object, forward step-up with the affected lower limb leading, forward step-up with the unaffected lower limb leading, lateral step-up towards the affected side, and lateral step-up towards the unaffected side. Each recording sheet included a 20-day exercise log with three columns corresponding to the three exercise circuits performed during every training session, enabling participants to document the number of repetitions completed in each circuit.

Participants were instructed to record the completed repetitions immediately after each training session. When necessary, caregivers assisted participants in maintaining the diary to ensure accurate documentation. The completed diaries were reviewed during weekly follow-up through telephone contacts to monitor adherence, verify exercise performance, and encourage continued participation throughout the four-week intervention period.

The total number of repetitions recorded in the diary was used to evaluate participants' functional task performance and progression over the intervention period.

(2) To assess Self Efficacy of Stroke survivors Stroke Self-Efficacy Questionnaire (SSEQ) was used. These questions are about your confidence that you can do some tasks that may have been difficult for you since your stroke. For each of the following tasks, circle a point on the scale that shows how confident you are that you can do the tasks now in spite of your stroke. Where 0 = not at all confident and 10 = very confident.[4]

The data of the subjects with 80% compliance to the protocol was considered for statistical analysis.

➢ *Statistical Analysis:*

Statistical analysis was performed using SPSS version 20. Descriptive statistics were calculated for all variables. Pre- and post-intervention scores of the Functional task repetitions & Self efficacy were compared to determine the effectiveness of the intervention. A significance level of $p < 0.05$ was considered statistically significant.

III. RESULTS

The distribution of data was evaluated using Shapiro-Wilk test. Since the data was not normally distributed for all outcome measures, non-parametric test (Wilcoxon Signed Ranked test) was was applied for analysis. Level of significance was kept at 5% with confidence interval (CI) at 95%.

Table 1 Demographic Details

No.	Variables	Mean ± SD
1	Mean Age (Years)	55 ± 9
2	Post Stroke Duration (Months)	31 ± 34
3	Gender (Male/Female)	14/1
4	Side of Stroke (Left/Right)	9/6
5	Type of Stroke (Ischemic/Hemorrhagic)	11/4

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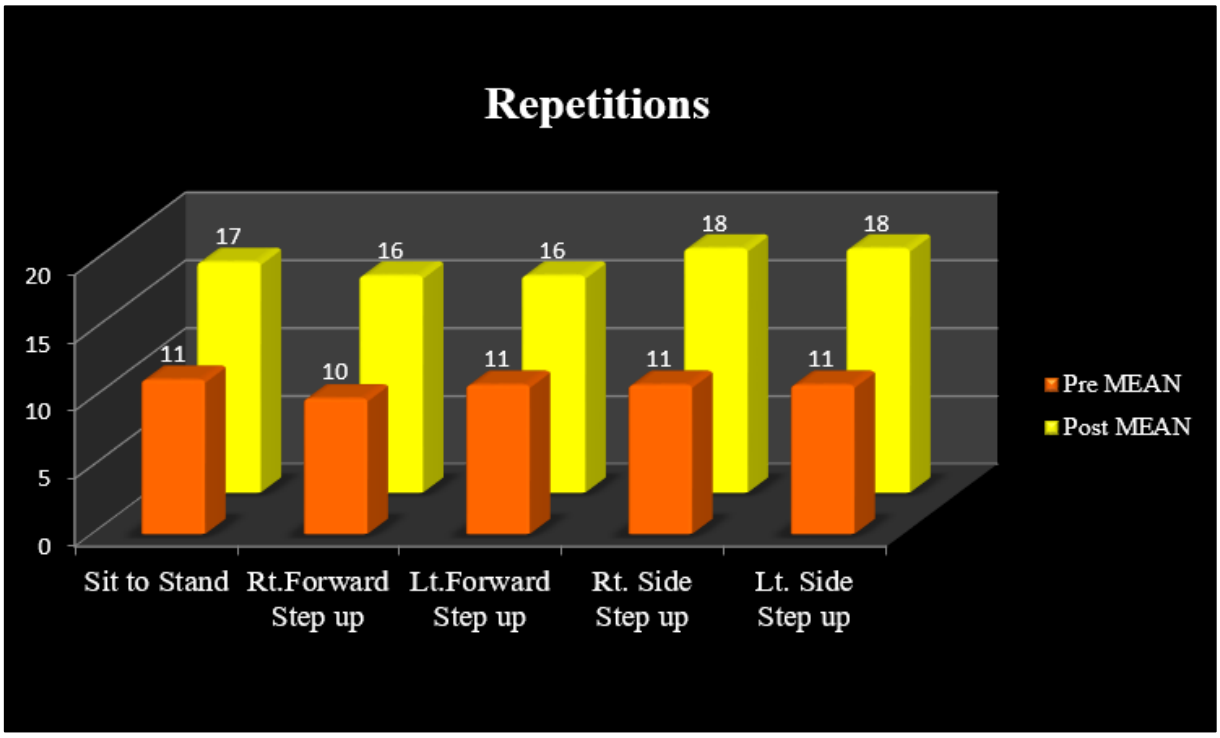
Table 2 Pre and Post Comparison of No. of Repetitions of Sit to Stand, Rt. step up, Lt. Step up, Rt. Side Step up and Lt. Side Step up

Repetitions	Day 1 Mean±SD	Day 20 Mean±SD	Zvalue	p Value Interpretation	Effect size Interpretation
Sit to Stand	11 ± 4	17 ± 5	2.644	0.008 SIGNIFICANT	1.3 Large Effect size
Rt. Forward Step up	10 ± 4.53	16 ± 5	3.421	0.001 SIGNIFICANT	1.25 Large Effect size
Lt. Forward Step up	11 ± 4.61	16 ± 5.88	3.412	0.001 SIGNIFICANT	0.9 Large Effect size
Rt. Side Step up	11 ± 4.01	18 ± 6.29	3.413	0.001 SIGNIFICANT	1.3 Large Effect size
Lt. Side Step up	11 ± 4.10	18 ± 6.50	3.417	0.001 SIGNIFICANT	1.3 Large Effect size



Graph 1 Pre and Post Comparison of No. of Repetitions of Sit to Stand, Rt. Step up, Lt. Step up, Rt. Side Step up and Lt. Side Step up

Pre and Post comparison for Repetitions was done using Wilcoxon Signed Rank Test that shows significant differences with Z value of 2.644(p=0.008), 3.421(p=0.001), 3.412(p=0.001), 3.413(p=0.001), 3.417(p=0.001) and with Large Effect size for Sit to Stand, Rt. Step up, Lt. Step up, Rt. Side Step up and Lt. Side Step up respectively.

Table 3 Pre and Post Comparison of Stroke Self-Efficacy Questionnaire Score

Variables	Pre-Intervention Mean ± SD	Post-Intervention Mean ± SD	Z Value	p Value	Interpretation
SSEQ 1	8.93 ± 2.22	9.6 ± 1.12	1.604	0.109	NOT SIGNIFICANT
SSEQ 2	9.53 ± 1.0	9.87 ± 0.35	1.633	0.102	NOT SIGNIFICANT
SSEQ 3	9.4 ± 0.99	9.8 ± 0.41	1.857	0.063	NOT SIGNIFICANT
SSEQ 4	9.4 ± 1.35	9.87 ± 0.52	1.841	0.066	NOT SIGNIFICANT
SSEQ 5	7.73 ± 2.15	9.13 ± 0.99	2.848	0.004	SIGNIFICANT
SSEQ 6	4.73 ± 4.17	4.73 ± 4.17	0.000	1.000	NOT SIGNIFICANT
SSEQ 7	7.4 ± 1.84	8.2 ± 1.47	2.762	0.006	SIGNIFICANT
SSEQ 8	4.33 ± 3.98	4.73 ± 4.20	1.604	0.109	NOT SIGNIFICANT
SSEQ 9	6.0 ± 1.36	8.2 ± 0.94	3.436	0.001	SIGNIFICANT
SSEQ 10	7.0 ± 1.96	8.8 ± 1.01	3.082	0.002	SIGNIFICANT
SSEQ 11	6.93 ± 2.46	7.87 ± 2.42	2.565	0.010	SIGNIFICANT
SSEQ 12	5.53 ± 1.85	7.87 ± 1.06	3.205	0.001	SIGNIFICANT
SSEQ 13	5.87 ± 1.51	8.13 ± 0.92	3.238	0.001	SIGNIFICANT

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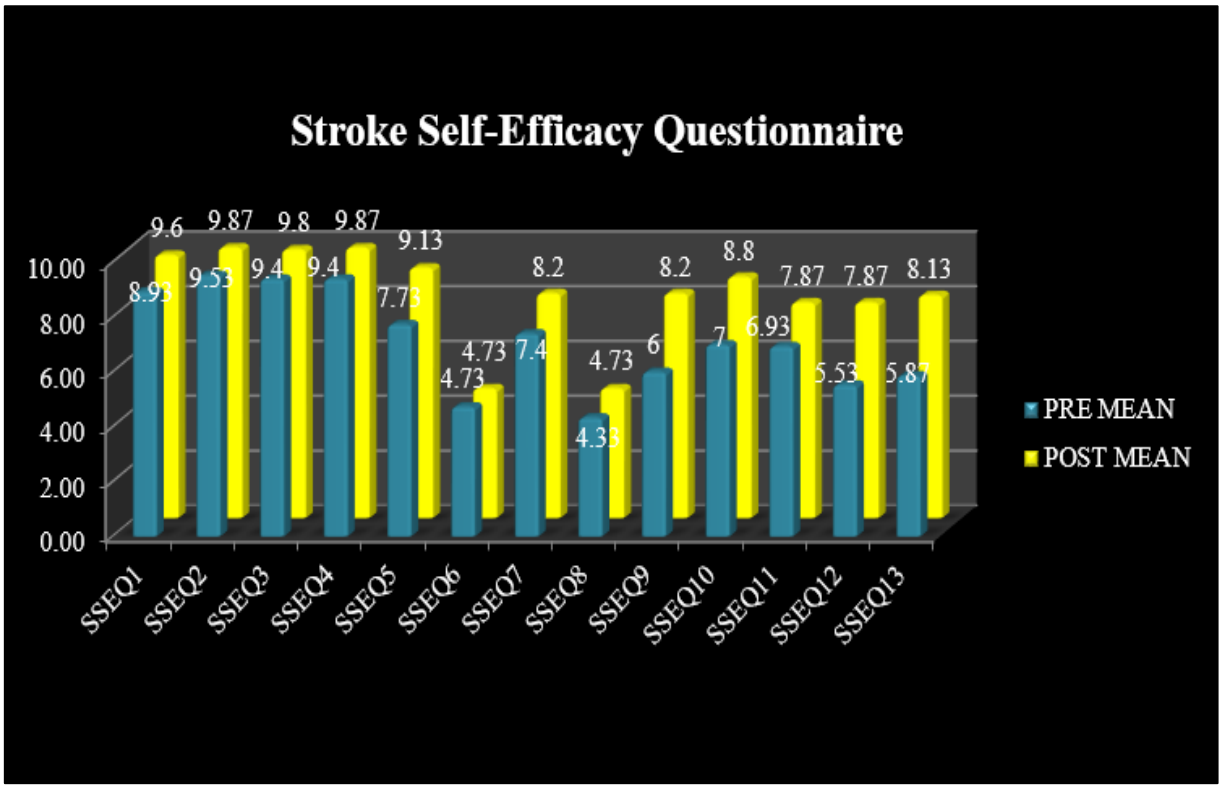

Graph 2 Pre and Post Comparison of Stroke Self-Efficacy Questionnaire Score

Pre and Post comparison for components of Stroke Self-Efficacy Questionnaire was done using Wilcoxon Signed Rank Test that shows significant differences with Z value of 2.848 (p=0.004), 2.762 (p=0.006), 3.436(p=0.001), 3.082 (p=0.002), 2.565 (p=0.010), 3.205 (p=0.001), 3.238 (p=0.001) for SSEQ5, SSEQ7, SSEQ9, SSEQ10, SSEQ11, SSEQ12 and SSEQ13 respectively.

IV. DISCUSSIONS

The present study demonstrated a significant improvement in functional task repetition following four weeks of home-based task-oriented training in individuals with chronic stroke. This improvement may be attributed to the repetitive practice of meaningful functional tasks, which enhances motor learning and functional performance through task-specific training.[8]

Repeated practice of sit-to-stand and step-up activities may have improved lower-limb muscle coordination, weight shifting, and balance control, enabling participants to perform a greater number of repetitions.[11]

Conducting the intervention in the home environment may have increased participants' familiarity with the tasks and encouraged regular practice, thereby improving functional performance.[3]

In addition, the structured home exercise diary may have promoted adherence by allowing participants to record their daily repetitions and monitor their progress throughout the intervention period. Self-monitoring has been reported to improve exercise participation and adherence in home-based rehabilitation programs.[2]

The findings of the present study are consistent with the systematic review by French et al. (2016)[8], which concluded that repetitive task training improves functional ability after stroke. Similar findings were reported by Jeon et al. (2015), who demonstrated that task-oriented training significantly improves lower-limb functional performance in individuals with stroke.

The present study demonstrated a significant improvement in stroke self-efficacy following four weeks of home-based task-oriented training. This improvement may be attributed to repeated successful performance of meaningful functional tasks in the home environment, which enhances patients' confidence in performing daily activities independently.[6]

According to Bandura's self-efficacy theory, successful completion of a task (mastery experience) is the strongest source of self-efficacy. Therefore, performing sit-to-stand and step-up activities repeatedly may have strengthened participants' confidence in their functional abilities.[6]

The investigator-developed structured home exercise diary may also have contributed to improved self-efficacy by allowing participants to record their daily repetitions and observe their progress over the four-week intervention. Visual feedback regarding gradual improvement can reinforce a sense of achievement and encourage continued participation in rehabilitation.

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Furthermore, practicing functional activities within the home environment may have increased participants' confidence by enabling them to perform tasks in familiar surroundings that closely resembled their daily routines.[1]

The findings of the present study are supported by Kei, C. P. et al. (2020)[2], who reported that a home-based rehabilitation program significantly improved self-efficacy among stroke survivors, highlighting the positive influence of continued home-based practice on confidence and functional independence.

V. CONCLUSION

The present study demonstrates that a four-week home-based task-oriented training program effectively increased functional task repetition and stroke self-efficacy in chronic stroke survivors. This approach may serve as a practical and accessible rehabilitation strategy for promoting long-term functional independence.

CLINICAL IMPLICATION

Incorporating structured home-based task-oriented training with systematic repetition monitoring may enable clinicians to objectively assess functional progression while reinforcing stroke survivors' self-efficacy for independent performance of daily activities. Monitoring repetitions through a structured home exercise diary may help therapists track adherence, provide timely feedback, and tailor exercise progression according to individual performance. Such an approach may enhance the continuity and effectiveness of community-based stroke rehabilitation. The same structured task-oriented training protocol may also be adapted for supervised clinical settings, allowing physiotherapists to implement and progress functional task practice according to the patient's individual needs.

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