



## Tailoring Hope: A Retrospective Investigation of Rehabilitation's Influence on Activities of Daily Living in Stroke Survivors

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### Abstract

**Background:** Stroke is the leading cause of long-term disability, impacting physical, cognitive, and emotional well-being. To address the consequences of stroke, personalized rehabilitation programs are essential. This retrospective study focuses on the impact of tailored rehabilitation on activities of daily living (ADL) in stroke survivors.

**Aim:** The primary aim of this study is to evaluate ADL improvement in stroke patients from following a tailored rehabilitation program at Transition Care Centers or Inpatient Rehabilitation Centers.

**Methods:** A retrospective analysis was conducted at HCAH Transition Care Centers over a 12-month period, involving 373 stroke patients with specific inclusion criteria. Participants received intensive physiotherapy and occupational therapy sessions along with other multidisciplinary rehabilitation therapies.

**Outcome Measures:** ADL assessments were conducted using a customized 14-component scale, encompassing basic and complex tasks, each rated on a scale from 1 (Completely Dependent) to 3 (Independent).

**Results:** The ADL scores were collected at the time of admission and discharge from each patient. Paired T-tests were employed to understand the statistical differences within the group. The results showed a significant p-values of 0.000 providing a high evidence of tailored made rehabilitation program on improving Activities of daily living.

**Conclusions:** This study demonstrates that tailored rehabilitation programs implemented at Transition Care Centers significantly improve Activities of Daily Living (ADL) in stroke survivors. Through intensive physiotherapy, occupational therapy, and multidisciplinary rehabilitation sessions, participants exhibited notable enhancements in both basic and complex tasks. The findings highlight the pivotal role of personalized rehabilitation plan in improving Activities of Daily Living and enhancing the quality of life.

**Keywords:** Early Rehabilitation; Stroke; Transition Care; Activities of Daily Living; Length of Stay

### Introduction

Stroke is the leading cause of long term disability that can not only lead to serious consequences in terms of physical, cognitive and emotional problems, but may also affect social reintegration and life satisfaction [1]. Annually, 17 million people worldwide suffer a stroke. Of these, 5 million die and another 5 million are left permanently disabled, placing a burden on family and community [2]. It is estimated that two out of every three people who suffer a cerebrovascular accident (CVA) have sequelae that affect

their quality of life<sup>7</sup> and CVA is the main cause of severe disability in adulthood [3-5]. In the first week after stroke, decisions about discharge destination and rehabilitation treatment are made on the basis of the expected outcome, of which activities of daily living (ADL) is an important determinant [3].

Stroke rehabilitation is a complex process that requires a multidisciplinary team of qualified professionals and constitutes the most effective treatment to reduce functional deficits. The rehabili-

tation intervention must be tailored to the patient, immediate, frequent, and intensive [6]. Nowadays, practices used in rehabilitation mostly consist of contributions from the international stroke rehabilitation guidelines [5]. Nevertheless, the treatment for people with stroke often varies considerably within a given country, with the clearest and most common division being between urban and rural areas [6].

Dependency in personal activities of daily living (ADL) is a common short-term and long-term consequence of stroke which requires targeted rehabilitation [7]. As the duration of hospital stay has become shorter in recent decades, early identification of patients who require rehabilitation has become vital [8-10]. This knowledge would facilitate planning for very early discharge and patient centred rehabilitation [11].

### Aim

The primary aim of this study is to evaluate ADL improvement in stroke patients from following a tailored rehabilitation program at Transition Care Centers or Inpatient Rehabilitation Center.

### Objective

- Determine whether stroke survivors who undergo a personalized rehabilitation program at a transition care center experience significant improvements in their activities of daily living.
- Analyze and compare the functional independence of stroke survivors before and after participating in the tailored rehabilitation program.
- Contribute to the body of knowledge regarding the role of tailored rehabilitation in enhancing the quality of life and functional outcomes of stroke survivors during their transition from acute care to home or long-term care settings.

### Methodology

A Retrospective study was carried out to evaluate the improvement in activities of daily living in stroke patients undergoing rehabilitation in transition care facility post discharge from hospital with a sample size of 373.

### Study setting and participants

The study was carried out in HCAH Transition Care Centre in a span of 12 months from July'22 – June'23. A total of 373 male and

female participants were recruited who met the inclusion criteria of presenting with Right/Left Hemiplegia, medically stable, diagnosed with ischaemic and haemorrhagic stroke with a GCS score equal and above 9. Medically Unstable, patients with cognitive impairment with Low GCS scores (less than 9) and patients diagnosed with Traumatic Brain Injury were excluded.

### Intervention

Participants received physiotherapy and occupational therapy sessions along with other multidisciplinary rehabilitation therapies for 6 days in a week [12]. Physiotherapy sessions consisted of strength training, motor control exercises for trunk, gait, and balance training [13,19]. Occupational therapy sessions consisted of intensive client centred occupational therapy intervention (ICC-OT) [14] which included collaborating with the participants and the family members to identify important areas of occupation for goal setting before discharge, understanding the participants' personal and environmental context. The protocol for intervention mainly focused on occupation centric upper limb training, static and dynamic sitting and standing balance training and mobility training using task-oriented approach, motor relearning program, adaptations and modifications of ADL's, caregiver education [15-18] and through promotion of participation in ADL lab, which consists of simulated dressing, bathing, grooming, eating and toileting facilities. Participants also had other multidisciplinary rehabilitation therapies including speech and swallow therapy, respiratory therapy, psychological therapy and nutrition therapy along with medical monitoring by doctors.

### Outcome measures

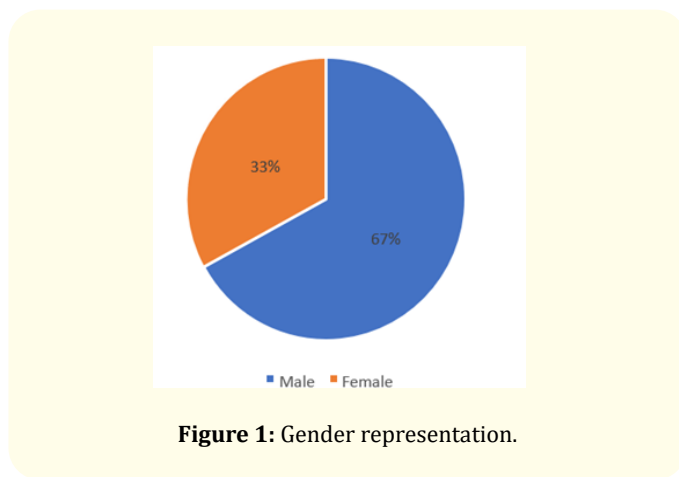
A Modified Activities of Daily Living Scale was custom made based on the requirements of the patients at HCAH Transition Care Center. This modified ADL Scale is tailored to meet the specific needs and requirements of the patients, which is essential for providing individualized care and rehabilitation. The inclusion of a wide range of ADL components, from basic self-care tasks to more complex activities, allows for a comprehensive evaluation of a patient's functional status. The scale includes 14 components which are Bathing/Showering, Getting Dressed, Grooming/Personal Hygiene, Toilet Hygiene, Eating, Walking, Climbing Stairs, Transfers, Safety/Emergency Responses, Preparing Food, Using Phone, Using Computer, Using vehicle, Self – Drive. Each component has 1-3 ratings and 1 denotes Completely Dependent, 2 denotes Needs Sup-

port and 3 denotes completely Independent. The scale was administered at baseline during admission and after 12 weeks.

**Results**

To calculate Mean and Standard deviation for the outcome variables, descriptive statistics were performed. Significant Difference within the group was analyzed by using Paired T test. \* and NS indicate significance and non- significance respectively at 5% level.

Figure 1 represents the Gender distribution in the form of Pie Diagram where 67% are Male and 33% Female.



**Figure 1:** Gender representation.

Table 1 displays the results of a paired samples t-test, which compares the performance of stroke survivors in various activities of daily living (ADL) before (A) and after (D) a rehabilitation program. The negative mean differences indicate significant improvements in each ADL category after intervention. All activities show highly significant results with p-values of 0.000, suggesting that the rehabilitation program had a substantial positive impact on patients' ADL capabilities. The degree of improvement varies across activities, but the consistent statistical significance highlights the program's effectiveness. The component with the largest (most negative) mean difference appears to be "WALKING" with a mean difference of -0.681, indicating a substantial improvement in walking abilities. The "SELF DRIVE" category, while still significant with a p-value of 0.021, showed a slightly lower level of improvement compared to other ADLs. Also, there is a considerable improvement in mean difference of other activities like USING PHONE, EATING, TRANSFERS and GROOMING in the ascending order.

Figure 2,3 and 4 Indicates the data of 3 variables at the time of Admission Vs Discharge

Table - 2 displays the results of from a paired samples t-test, comparing specifically between "Admission" and "Discharge." The negative mean difference of -0.45070 and t-value of -19.491, along

	Paired Differences					t	df	Sig. (2tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
BATHING/SHOWERING A - BATHING/SHOWERING D	-.389	.565	.029	-.446	-.331	-13.295	372	.000
GETTING DRESSED A - GETTING DRESSED D	-.493	.594	.031	-.554	-.433	-16.040	372	.000
GROOMING/PERSONAL HYIGENE A - GROOMING/PERSONAL HYIGENE D	-.558	.648	.034	-.624	-.492	-16.630	372	.000
TOILET HYIGENE A - TOILET HYIGENE D	-.426	.594	.031	-.487	-.366	-13.861	372	.000
EATING A - EATING D	-.643	.779	.040	-.723	-.564	-15.958	372	.000
WALKING A - WALKING D	-.681	.698	.036	-.752	-.610	-18.853	372	.000

CLIMBING STAIRS A - CLIMBING STAIRS D	-.290	.541	.028	-.345	-.235	-10.344	372	.000
TRANSFERS A - TRANS- FERS D	-.641	.660	.034	-.708	-.574	-18.760	372	.000
SAFTEY/EMERGEN CY RESPONSES A - SAFTEY/EMERGEN CY RESPONSES D	-.581	.705	.037	-.653	-.509	-15.877	371	.000
PREPARING FOOD A - PRE- PARING FOOD D	-.182	.474	.025	-.231	-.134	-7.427	372	.000
USE PHONE A - USE PHONE D	-.681	.774	.040	-.760	-.602	-16.985	372	.000
USE COMPUTER A - USE COMPUTER D	-.491	.694	.036	-.561	-.420	-13.651	372	.000
USE VEHICLE A - USE VEHICLE D	-.236	.547	.028	-.292	-.180	-8.332	372	.000
SELF DRIVE A - SELF DRIVE D	-.021	.178	.009	-.040	-.003	-2.323	372	.021

Table 1

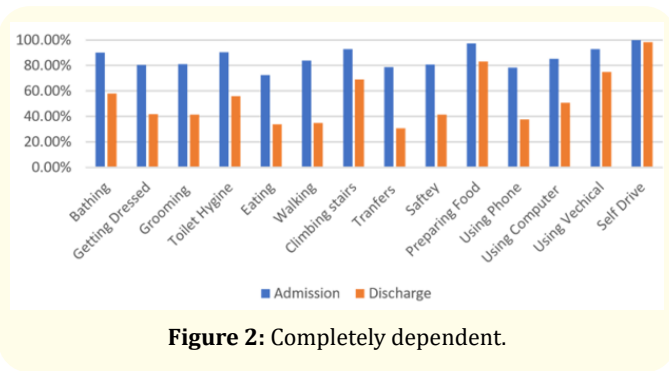


Figure 2: Completely dependent.

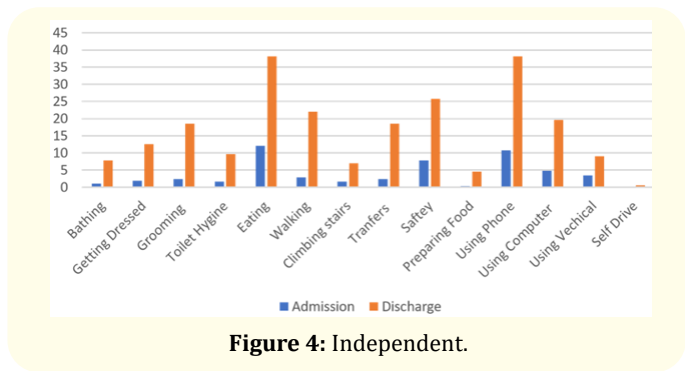


Figure 4: Independent.

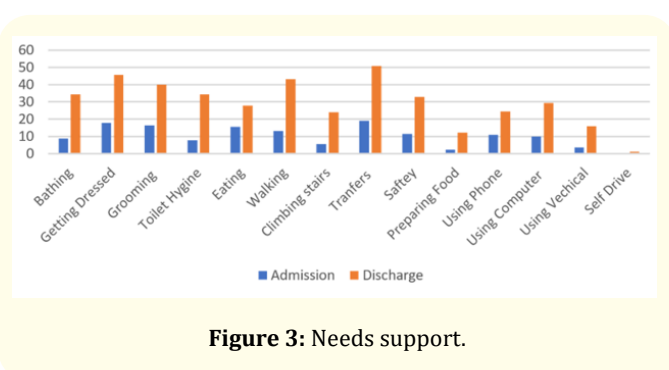


Figure 3: Needs support.

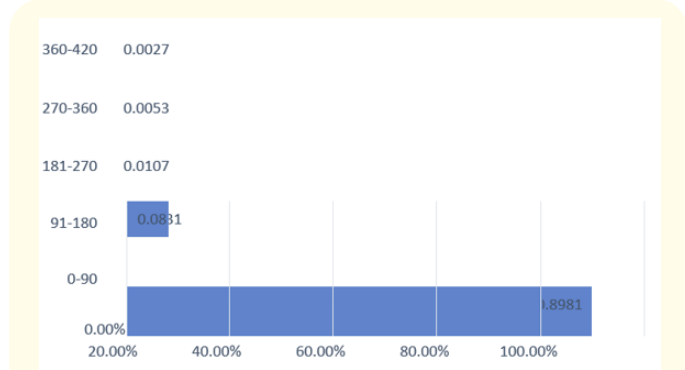


Figure 5: ALOS.

	Paired Differences					t	df	Sig. (2tailed)
	Mean	Std.Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Admission - Discharge	-.45070	.44660	.02312	-.49617	.40523	-19.491	372	.000

**Table 2:** Paired Samples Statistics.

with a p-value of 0.000 indicates a statistically significant changes in this parameters over time from admission to discharge. The t-value and p-value (0.000) basically indicates improvement is very likely because of the rehabilitation program they went through. So, overall, tailored rehab program is making a real and positive difference in stroke survivors.

Above Figure 5 depicts that 90 % of the improvement happened in the functional activities in the initial 90 days of the Actual Length of Stay (ALOS). Post that the 10 % continuity of the improvement indicates the ongoing neural wiring/plasticity.

**Conclusion**

Results indicate a definite improvement in the multiple variables of Activities of Daily Living which is the primary goal of any rehabilitation. The structured Programme at the early stages of stroke is very important in neuroplasticity of brain. Neuroplasticity underscores the potential for recovery and rehabilitation after a stroke. It allows the brain to redistribute functions to undamaged areas or develop new pathways to compensate for lost functions.

Neuroplasticity is time-dependent, with the greatest potential for change occurring in the early stages after a stroke. However, it remains a lifelong process, and recovery can continue over the long term. Further, functional independence of the patients encourages them to be positive in their occupational or social life.

The non – improvement of few parameters are indicative of the treatment regimen to focus on the creation of environment to mimic driving and teach/train them for the emergency/safety responses. It is noteworthy to understand that these two parameters require rational and complex thinking and coordination of upper and lower limb activities along with correct reaction time.

Focusing on all the components along with long duration treatment protocol would help further comprehensive goal achievement. Active involvement and focused efforts of patient and family in ensuring the implementation of daily activities will help in early and effective results.

**Bibliography**

1. Maria L., *et al.* “Quality of Life during the First Two Years Post Stroke: The Restore Stroke Cohort Study”. *Cerebrovascular Disease* 41 (2016): 19-26.
2. Feigin VL., *et al.* “Global Burden of Diseases, Injuries, and Risk Factors Study 2010 (GBD 2010) and the GBD Stroke Experts Group. Global and regional burden of stroke during1990-2010: findings from the Global Burden of Diseases Study 2010”. *Lancet* 383.9913 (2014): 245-255.
3. Olver J., *et al.* “Post Stroke Outcome: Global Insight into Persisting Sequelae Using the Post Stroke Checklist”. *Journal of Stroke and Cerebrovascular Diseases* 30 (2021): 105612.
4. Wu CY., *et al.* “Relationship Consensus and Caregiver Burden in Adults with Cognitive Impairments 6 Months Following Stroke”. *PM R* 11 (2019): 597-603.
5. Marotta N., *et al.* “International Classification of Functioning, Disability and Health (ICF) and Correlation between Disability and Finance Assets in Chronic Stroke Patients”. *Acta Biomedicine* 91 (2020): e2020064.
6. Lasprilla JCA., *et al.* “Manual Moderno: Mexico City, Mexico, 2019. Interventions within the Scope of Occupational Therapy in the Hospital Discharge Process Post-Stroke: A Systematic Review” (2019).
7. Jönsson AC., *et al.* “Determinants of quality of life in stroke survivors and their informal caregivers”. *Stroke* 36 (2005): 803-808.

8. Gjelsvik BEB, *et al.* "Balance, and Walking after Three Different Models of Stroke Rehabilitation: Early Supported Discharge in a Day Unit or at Home, and Traditional Treatment (Control)". *BMJ Open* 4 (2014): e004358.
9. Mudzi W, *et al.* "Effect of Carer Education on Functional Abilities of Patients with Stroke". *International Journal of Therapy and Rehabilitation* 19 (2012): 380-385.
10. Rafsten L, *et al.* "Gothenburg Very Early Supported Discharge Study (GOTVED): A Randomised Controlled Trial Investigating Anxiety and Overall Disability in the First Year after Stroke". *BMC Neurology* 19 (2019): 277.
11. Rasmussen RS, *et al.* "Stroke Rehabilitation at Home before and after Discharge Reduced Disability and Improved Quality of Life: A Randomised Controlled Trial". *Clinical Rehabilitation* 30 (2016): 225-236.
12. Saal S, *et al.* "Effect of a Stroke Support Service in Germany: A Randomized Trial". *Topics in Stroke Rehabilitation* 22 (2015): 429-436.
13. Taule T, *et al.* "Ability in Daily Activities after Early Supported Discharge Models of Stroke Rehabilitation". *Scandinavian Journal of Occupational Therapy* 22 (2015): 355-365.
14. Tove Lise Nielsen, *et al.* "Intensive client-centred occupational therapy in the home improves older adults' occupational performance. Results from a Danish randomized controlled trial". *Scandinavian Journal of Occupational Therapy* 26.5 (2019): 325-342.
15. Chu K, *et al.* "Feasibility of a Nurse-Trained, Family Member-Delivered Rehabilitation Model for Disabled Stroke Patients in Rural Chongqing, China". *Journal of Stroke and Cerebrovascular Diseases* 29 (2020): 105382.
16. Wu Z, *et al.* "Collaborative Care Model Based Telerehabilitation Exercise Training Program for Acute Stroke Patients in China: A Randomized Controlled Trial". *Journal of Stroke and Cerebrovascular Diseases* 29 (2020): 105328.
17. Zhou B, *et al.* "Caregiver Delivered Stroke Rehabilitation in Rural China". *Stroke* 50 (2019): 1825-1830.
18. Feng W, *et al.* "Application Effect of the Hospital-Community Integrated Service Model in Home Rehabilitation of Stroke in Disabled Elderly: A Randomised Trial". *Annals of Palliative Medicine* 10 (2021): 4670-4677.
19. Che S, *et al.* "Effectiveness of a Home-Based Exercise Program among Patients with Lower Limb Spasticity Post-Stroke: A Randomized Controlled Trial". *Asian Nursing Research* 15 (2021): 1-7.