Effectiveness of Home-based Physiotherapy on Functional Outcome among Stroke Participants in India

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Abstract

Background: Stroke is one of the leading causes of mortality and disability, especially physical impairments that significantly limits the activities of daily living (ADLs). Stroke survivors who eventually return home post discharge from hospital need to undergo a home-based rehabilitation as their needs cannot be met exclusively in the hospital. Thus, home based rehabilitation provides an alternative to hospital-based treatment and helps patients form a therapeutic connection to their activities of daily living. Therefore, this study was done to analyze the effects of home -based physiotherapy on ADL's in participants with stroke.

Material and Method: 119 stroke participants registered with Health care at Home from January 2018 to December 2018 were included in the main analysis who received average 66.6 number of physiotherapy sessions in the form of exercise therapy, approximately for 45-60 minutes. The Barthel Index (BI) scores as a functional outcome were recorded fortnightly.

Findings: The study demonstrated that the home-based physiotherapy program significantly improved functional outcome in stroke participants.

Conclusion: Based on the analysis, it is concluded that home-based physiotherapy improves functional outcomes in terms of activities of daily living of stroke participants. Study also revealed some initial insights on the stroke cases that did not show considerable improvement.

Keywords: *Stroke, Barthel Index, Home-Based Physiotherapy.*

Introduction

Stroke is one of India's leading causes for death and disability.[1] The cumulative incidence of stroke in India ranged from 105 to 152/100,000 people per year in different parts of the country over the last two decades.[2]

Stroke most commonly results into motor impairment, which usually affects the control of movement of the face, arm, or leg of one side of the body in approximately 80 percent of patients of varying degrees.[3] Motor dysfunction can impair the patient's ability to perform daily activities and develop a state of dependency. Further disability will bring patient into decreased social participation/function.[4]

The most important treatment for people with stroke is well organized dedicated care, which enables well-coordinated assessment, goal setting, intervention and reassessment, which focuses largely on the reduction of impairment and stroke-related disability.[5] Stroke recovery is heterogeneous and dynamic and is likely to occur through a combination of spontaneous and learning-dependent mechanisms.[6]

Home care not only meets the standard of hospital care, but also offers patients the added benefit of comfort at home. Moreover, care is being delivered in a real-life scenario so patients can adapt to their limitations.[7,8]

Pandian JD et.al reported that approximately 35 stroke units were available mainly in private sector hospitals in cities in India till the year 2013.[1] Very few centers have established in-hospital and out-patient rehabilitation centers in the country. Even though proper

stroke unit and rehabilitation facilities may meet medical, physical and psychosocial needs during the early post-stroke stage, the long-term requisites of patients and families cannot be addressed merely in the hospital.[9,10]

Advocates for early-supported discharge and home-based stroke recovery, centered on a structured stroke unit model of treatment claim that it provides many advantages: accommodating patient choice; mitigating complications associated with inpatient care through decreases in length of hospital stay; optimizing rehabilitation, as the home environment is more focused on rational objectives; social inclusion; and a supportive environment.[11, 12]

Keeping in mind that the standardized home care physiotherapy services is an evolving model of care in India that can help bridge the gap in accessibility and possibly meet the functional rehabilitation needs of stroke survivors, this study was therefore conducted to analyze the effectiveness of home-based physiotherapy on functional outcomes in terms of activities of daily living among stroke participants in India.

Material and Method

Out of 181 individuals with stroke receiving Healthcare at Home physiotherapy services across various locations in India from January 2018 to December 2018, 119 individuals (76 males and 43 females) who consented with mean age (65±13 years) were included in the study. 62 participants were excluded from this study as 13 dropped during the sessions within a week, in 35 cases outcome data were missing and 13 participants started with other treatments.

Individuals who had bilateral affection, took self -discharge within one week of physiotherapy were excluded from the study. Before starting treatment, the concerns and expectations of the participants had been clearly understood and the SMART goals were set individually by consensus, which was documented as part of standard process at health care at home.

All physiotherapists were trained on skills and techniques required to manage participants with stroke. Individual care plans were designed for all patients which were reviewed and modified as per change in the patient's condition by the physiotherapists.

The study was conducted in agreement with the principles of the Helsinki Declaration of 1975, as revised in 1996.

To analyze the impact of home-based physiotherapy on functional independence, the Barthel Index (BI) score as a functional outcome was taken at the time of initial assessment and reviewed fortnightly.

In the present study BI scale of 10 tasks that describe ADL and mobility, scoring zero to 100 with five-point increments was used.[13,14]Total BI score of 0 to 20 indicates total dependence, severe dependence of 21 to 60, moderate dependence of 61 to 90 and mild dependence of 91 to 99,a score of 100 indicates that the patient is free from any assistance from others.[15]

Studies have reported minimal clinically important difference (MCID) with an average improvement in BI score of 1.85-2 points and aminimal detectable change (MDC) in BI of 4.02 in stroke.[16,17,18]

All outcomes were recorded in the registered platform Patient Care System (PCS). Each patient received 45-60 minutes of individually supervised physiotherapy session at home.

Physiotherapist had decided the duration of treatment and the frequency of treatment, depending on the severity of the patient's condition. The average duration of treatment cycle was 83±74 days (mean number of sessions delivered, 67±69).

The goals of the treatment were to reduce complications, restore function and provide patients with strategies to overcome their condition and their immediate environment. The interventions aimed to normalize the postural tone, enabling the mobility of the patient in bed, helping the patient in transfers, improve balance and allow the patient to walk with or without assistive equipment.

Care giver and family members were explained about the condition, its outcomes, precautions, risks involved as well as about the home exercise program. Progression in the exercise program was done basis the patient's performance and feedback during the sessions.

Data were analyzed using the Wilcoxon signed rank test and the average change in BI before and after the intervention was observed. The significance level α was set at 0.05.

Findings: After implementing home - based physiotherapy program, the mean BI score significantly improved from 37.07±28.64 to 54.21±30.00 ($p<0.05$) (Table 1).

Table 1: Count of participants, mean age, mean number of sessions, mean number days of service, initial and final mean values of BI with mean improvement

	Number of participants	Mean Age	Mean number of sessions	Mean number of days of service	Mean Initial BI Score±SD	Mean Final BI score ±SD	Mean BI Improvement ±SD
Total	119	65	67±69	83±74	37.07±28.64	54.21±30.00	17.14±20.00*
Male	76	65	58±57	75±67	39.4±30.7	55.1±32.0	17.12±20.09*
Female	43	64	82±84	98±83	33.0±24.3	52.6±26.3	18.21±20.14*

BI: Barthel Index, *Significant difference at P<0.05

Statistically significant differences (p<0.05) between the initial and final mean BI values among different age groups (less than 50, 50-65, more than 65 years) were also observed, with highest improvement in individuals with stroke of 50-65 years age group (43.13±29.52 to 62.74±28.75) (Table 2).

Table 2: Age wise improvement with initial and final mean BI values.

Age Wise Improvement	Number of participants	Mean number of sessions	Mean Number of days of service	Mean	Age Wise Improvement
<50	11	54	69	54.73±19.05	68.82±19.9*
50-65	47	68	86	43.13±29.52	62.74±28.7*
>65	61	66	82	29.21±27.13	45.00±29.8*

BI: Barthel Index, *Significant difference at P<0.05.

Further, the BI scores showed significant improvement (p<0.05) basis the level of dependence with highest improvement was observed in total dependence BI group.

Table 3: BI scores basis the level of dependence with initial and final mean BI and mean BI improvement.

Interpretation	Number of participants	Mean number of sessions	Mean initial BI Score±SD	Mean final BI score±SD	Mean BI improvement±SD
0-20 (Total dependence)	46	87	8.17±7.05	30.54±24.20	22.37±22.2*
21-60 (severe dependence)	50	58	43.46±11.48	61.70±22.67	18.24±19.0*
61-90 (Moderate dependence)	18	51	75.94±8.55	81.33±12.49	5.39±10.71*
91-99 (slight dependence)	1	11	95.00±0.00	97.00±0.00	2.00±0.00*
100 (independent)	4	26	100.00±0.00	100.00±0.00	0.00±0.00

BI: Barthel Index, *Significant difference at P<0.05.

Discussion

The present study reflected that individuals with stroke improved on activities of daily living after home based physiotherapy. The mean BI scores improved by 17 which is higher than what MCID and MDC reported in previous studies.[16-17]

The findings were in accordance with the results of other studies that found that interventions designed to reduce spasticity, strengthen muscles and train individuals with stroke on a normal pattern of movement will help to improve physical function and restore activities of daily living.[18]

Family support, the home environment of rehabilitation, an individually designed treatment plan and close follow-up have been considered to be the key factors in facilitating functional improvement.[19-22]

Literature suggests that home-based physiotherapy in a controlled environment enable the individuals with stroke to perform the daily routine activities effectively.[23-25]

Previous studies[26-28] have shown that home rehabilitation programs after stroke provide significantly better outcomes in terms of physical function and reduced disability than other conventional care programs offered in various settings.

Remedios Lopez-Liria et al. conducted a follow up study comparing two post stroke rehabilitation programs among primary versus specialized health care and the results showed average improvement of BI score of 37.17 in the home-based rehabilitation group and 22.35 in the hospital group. Patients in the home-based rehabilitation group showed more improvement in BI score as they had received physiotherapy within the first week after stroke and were treated by a multidisciplinary team.[29]

In a study done by Rune Skovgaard Rasmussen et al. it was concluded that 20-70 minutes of daily home-based exercise session for a month post discharge from hospital increased modified Barthel index scores from 75 to 99 which were taken 90 days post stroke.[30]

Our study also revealed some valuable insights that 23% of stroke participants were unable to show functional improvement following home-based physiotherapy due to recurrence of stroke, self-discharge prior to completion of recommended physiotherapy sessions, multiple co-morbidities, infection, long standing stroke and severe stroke.

In addition, functional status was declined among 3% stroke participants because of disability resulted from 10 years old stroke, no co-operation and lack of confidence towards improvement with the help of physiotherapy. Out of total 119 participants included in this study, 71% had shown average improvement in BI score of 24.

The present study had few limitations, such as prognosis were not differentiated on the basis of ischemic or hemorrhagic stroke. Impact of comorbidities on post stroke recovery was also not evaluated. We also could not track the long-term outcome of home -based physiotherapy.

Future research should focus on measuring quality of life from the perspective of subsequent studies that track the overall impact of home physiotherapy services for stroke participants.

Conclusion

In conclusion, goal oriented home-based physiotherapy with consistent monitoring of outcomes led to significant improvement in functional outcome in participants with stroke.

The result of present study can be used as guide and may provide direction for organizations providing home-based physiotherapy care in India. Large scale studies are needed to support our findings and long-term follow-up is required for further analysis.

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