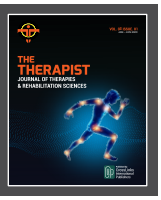
DOI: https://doi.org/10.54393/tt.v4i04.175

THE THERAPIST
JOURNAL OF THERAPIES & REHABILITATION SCIENCES
https://thetherapist.com.pk/index.php/tt
Volume 4, Issue 4 (October-December 2023)



Original Article

Comparative Analysis of Fall Prevention Strategies: Assessing the Efficacy of Transfer Techniques versus Routine Physical Therapy in Wheelchair-Using Stroke Patient

Usama Arif[1], Tamjeed Ghaffar[2], Malaika Yasin[1], Dur e Najoom Bazgha[1], Pakeza Sarwar[3], Kiran Shafique[3] and Amna Khalid[4*]

[1]College of Physical Therapy, Government College University, Faisalabad, Pakistan
[2]Faculty of Medical Sciences, Government College University, Faisalabad, Pakistan
[3]Women Institute of Learning and Rehabilitation Sciences, Abbottabad, Pakistan
[4]Department of Physical Therapy, King Edward Medical University, Lahore, Pakistan

ARTICLE INFO

Key Words:
Fall Prevention, Physical Therapy, Ischemic Stroke, Transfer Technique, Chedoke-Mc Master Test

How to Cite:
Arif, U., Ghaffar, T., Yasin, M., Bazgha, D. e N., Sarwar, P., Shafique, K., & Khalid, A. (2023). Comparative Analysis of Fall Prevention Strategies: Assessing the Efficacy of Transfer Techniques versus Routine Physical Therapy in Wheelchair-Using Stroke Patient : Comparative Analysis of Fall Prevention Strategies . THE THERAPIST (Journal of Therapies &Amp; Rehabilitation Sciences), 4(04). https://doi.org/10.54393/tt.v4i04.175

***Corresponding Author:**
Amna Khalid
Department of Physical Therapy, King Edward Medical University, Lahore, Pakistan
amnakhalid2127@gmail.com

Received Date: 8th November, 2023
Acceptance Date: 23rd December, 2023
Published Date: 31st December, 2023

ABSTRACT

Stroke is often caused by high blood pressure or aneurysm. It leads to mobility issues such as hemiplegia, quadriplegia, and hemiparesis. **Objective:** To determine the effects of transfer techniques or routine physical therapy to prevent fall from wheelchair in private and public hospitals of Faisalabad and their comparison. **Methods:** This was a quasi-experimental trial. Through purposive sampling, 30 participants were selected and allocated to two groups i.e., group A (routine exercise group) and group B (transfer training group) with 15 participants in each group. Both groups received training for six weeks, with two training sessions per week. The Time Up and Go test, Balance Berg scale and Fall Efficacy Scale were used to access the fall ratio. SPSS version 26.0 was used to analyze and interpret results. **Results:** Mean age of the patient was 38.17±3.742. 63.3% were males and 36.7% were female patients. Within group analysis showed that both transfer techniques and routine physical therapy was effective in fall prevention with p-value < 0.05. Between group analyses showed that, there was statistically significant difference in both transfer techniques and routine physical therapy after the treatment of six weeks (p<0.05). **Conclusions:** Both transfer techniques and routine physical therapy were effective in fall prevention. But transfer techniques were found to be more effective in fall prevention than only the routine physical therapy and significant differences in the results were seen after the treatment in Fall Efficacy Scale (FES).

INTRODUCTION

A stroke, also known as an attack, occurs when a blood vessel in the brain crashes or when something blocks the blood supply to of the brain [1]. In both scenarios, specific areas of the brain suffer from damage or undergo neuronal death [2]. Each region of the brain is responsible for a distinct function or ability. When an individual experiences a stroke, it can result in damage to specific regions of the brain, leading to the impairment of regular bodily functions in the affected areas. This condition has the potential to lead to disability [3]. Regrettably, mortality can occur because of a brain stem stroke. There are various classifications of stroke. The most prevalent form of stroke is ischemic stroke, and it refers to a type of stroke that occurs when there is a disruption of blood flow to the brain, resulting in a lack of oxygen and nutrients to brain [4]. During the period from 2000 to 2010, there was a notable decline of approximately 20% in hospitalizations related to ischemic stroke across all age groups. However, it is worth noting that within the age range of 25 to 44, there was a significant surge of 44% in the incidence rate of hospitalizations for ischemic stroke [5]. Hemorrhagic stroke refers to a type of cerebrovascular accident

DOI: https://doi.org/10.54393/tt.v4i04.175

characterized by bleeding within the brain [6, 7]. Hemorrhagic stroke accounts for approximately 10% to 20% of annual stroke cases. The prevalence of hemorrhage in stroke ranges from 8% to 15% in the United States of America, the United Kingdom, and Australia, while in Japan and Korea, it is reported to be between 18% and 24%. The prevalence of this condition is estimated to be approximately 12% to 15% per 100,000 individuals annually [8]. Transient Ischemic Attack (TIA) refers to a temporary interruption of blood flow to a specific region of the brain, resulting in a brief period of oxygen deprivation [9, 10].The management of individuals afflicted with stroke and their subsequent rehabilitation is a significant professional obligation within healthcare facilities [11]. Research findings indicate that a significant proportion of patients, specifically 96% and 79% respectively, who are hospitalized due to hemiplegic stroke, receive either physiotherapy, occupational therapy, or a combination of both interventions [12].The treatment of stroke patients is regarded as a specialized area of practice by physiotherapists, who have developed and refined various approaches to treatment in a pragmatic manner [13]. When individuals with physical and cognitive disabilities utilize wheelchairs (WC), the risk of falls is heightened, potentially leading to severe injuries that may prove fatal and life-threatening. Three distinct studies have conducted estimations on the annual occurrence of severe accidents associated with the use of wheelchairs within three separate populations, yielding incidence rates of 3.2%, 5%, and 17.7% respectively.2,3,6 [14]. A Review of Evidence-Based Guideline Falls during transfer – defined as transferring one's body from one surface to another – may result from an improperly maintained wheelchair [15]. Effective fall prevention accounts for the combination of fall risk factors unique to each senior, tailoring the intervention to target the individual's specific health status, situation, and environment [16]. Evidence-based fall-prevention guidelines can assist in assessment of individual patients' fall risks as well as establish standards to decrease the number and effect of falls [17, 18].

Stroke-induced mobility issues often lead to patients relying on wheelchairs for movement, increasing the risk of falls. Understanding the effectiveness of transfer techniques and routine physical therapy is crucial for developing tailored fall prevention strategies in rehabilitation settings. The present study aimed to assess and compare the efficacy of transfer techniques and routine physical therapy in preventing falls among wheelchair-using stroke patients in both private and public hospitals in Faisalabad. While there is existing research on fall prevention among stroke patients, a specific gap persists in comparing the impact of transfer techniques versus routine physical therapy in the context of wheelchair use. This study seeks to address this gap by providing insights into the comparative effectiveness of these interventions. The findings of this study can guide healthcare practitioners in choosing optimal interventions for fall prevention in wheelchair-using stroke patients, contributing to enhanced rehabilitation protocols. This research has the potential to improve the quality of care provided to stroke patients, ultimately reducing the incidence of falls and promoting safer mobility.

METHODS

This was a quasi-experimental trial in which data was collected through purposive sampling with 30 sample size. The study setting to conduct this study was the District Head Quarters Hospital, Allied Hospital Faisalabad, Faisalabad Institute of Cardiology, Govt. General Hospital Samanabad, Faisal Hospital Faisalabad, National Hospital, Faisalabad and Chiniot General Hospital, Faisalabad. The duration of this research was 6 months. Sample size was 30 and was calculated through online Open Epitool software. The study subjects of this research were stroke people using wheel chair. Inclusion criteria of the study were 18 to 50 years old patients totally dependent on WC, at least 1 self-reported fall in past 12 months, hemiplegic ischemic stroke patient, subacute chronic stage of stroke received the score of less than 6 on Chedoke Mc Master Test. Exclusion criteria were stroke patients who did not totally rely on WC and can do mobility using crutches, patient with shoulder subluxation and patient had recent trauma i.e. respiratory disorder, surgery. A total of 30 participants were selected after meeting the selection criteria and signed the consent form. There were two group i.e. group A (routine exercise group) and group B (transfer training group) with 15 participants in each group. Routine exercise group received traditional physical therapy exercise, such as strengthening, and balance exercises. The transfer training group received transfer specific training that aimed to improve wheelchair transfers, such as sit to stand, stand to sit, and wheelchair to bed transfers. Both groups received training for six weeks, with two training sessions per week .Validity testing of the tests was performed for Balance, Strength, and Mobility with tools such as G power, Time Up and Go Test, Berg Balance Scale, Fall Efficacy Scale and Wheel Chair Test for hemiplegic stroke patient in comparison to reduce risk of fall between routine physical therapy and wheel chair transfer training. The data was analyzed by SPSS version 26.0. Frequency distribution and Descriptive statistics were presented in form of tables and graphs. Paired t-test was used for within group analysis. Independent Sample T-Test was used for between group analysis. All the ethical considerations were taken into the account. A permission letter was signed by the Head of

DOI: https://doi.org/10.54393/tt.v4i04.175

Department. Study received approval from instituitional review board of "Governement College Univeristy Faisalabad". The procedure, importance, and the purpose of this study was shared with all the participants. Only those participants who were willing to participate in this study were included. The personal data was kept confidential.

RESULTS

Figure 1 shows the frequency distribution of gender in which 19 male (63.3%) and 11 female (36.7%) patients were included.

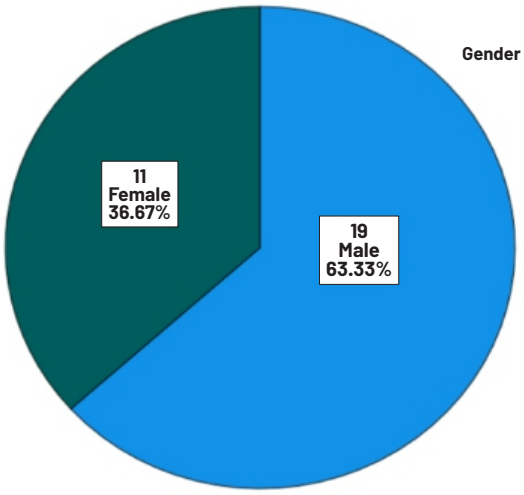


Figure 1: Gender Distribution.

Figure 2 shows age of the patient in which N=30 with mean 38.17 and std. deviation 3.742.

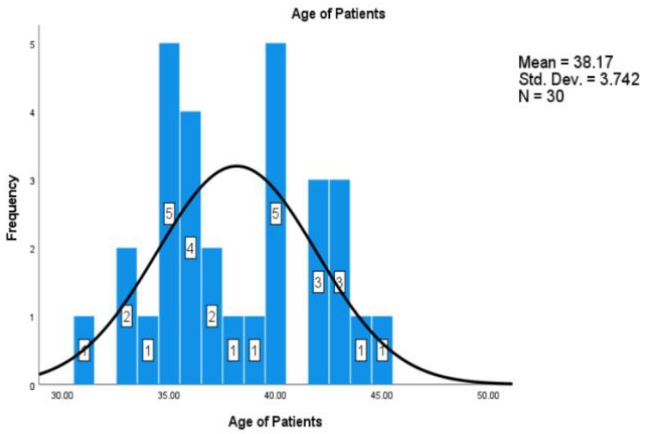


Figure 2: Age Distribution

For within group difference paired sample t-test was applied. The paired difference of BBS in Group A was (-7.067 ± 2.491) with significant p-value (.001) and paired difference in group B was (-5.267 ± 2.282) with significant p-value (.001). See Table 1.

Table 1: Within group difference of Berg Balance Scale at baseline and after treatment

Assessments	Treatment Groups			
	Group A		Group B	
	N	Mean ± SD	N	Mean ± SD
BBS at Baseline	15	38.733 ± 4.620	15	36.333 ± 6.195
BBS after Treatment	15	45.800 ± 2.883	15	41.600 ± 5.288
Paired Differences		-7.067 ± 2.491		-5.267 ± 2.282
P-value		.001		.001

The paired difference of TUG in Group A was (11.733 ±3.432) with significant p-value (.001) and paired difference in group B was (6.400 ±2.848) with significant p-value (.001). See Table 2.

Table 2: Within groups difference of Time Up and Go Test at baseline and after treatment

Assessments	Treatment Groups			
	Group A		Group B	
	N	Mean ± SD	N	Mean ± SD
TUG at Baseline	15	25.200 ± 5.608	15	23.333 ± 5.614
TUG after Treatment	15	13.466 ± 3.461	15	16.933 ± 3.555
Paired Differences		11.733 ± 3.432		6.400 ± 2.848
P-value				.001

The paired difference of FES in Group A was (20.333 ±5.232) with significant p-value (.001) and paired difference in group B was (15.733 ±6.734) with significant p-value (.001). See Table 3.

Table 3: Within group difference of Fall Efficacy Scale at baseline and after treatment

Assessments	Treatment Groups			
	Group A		Group B	
	N	Mean ± SD	N	Mean ± SD
FES at Baseline	15	54.533 ± 3.204	15	54.000 ± 2.725
FES after Treatment	15	34.200 ± 3.144	15	38.266 ± 6.681
Paired Differences		20.333 ± 5.232		15.733 ± 6.734
P-value				.001

Table 4 shows between groups comparison applying independent sample t-test. BBS at baseline shows mean ±SD of group A (38.733 ±4.620) and group B (36.333 ±6.195) with t value (1.203) and p-value (.239) shown non-significant differences between groups at baseline. After treatment mean ±SD of group A (45.800 ±2.883) and group B (41.600 ±5.288) with t value (2.700) and p-value (.012) shown significant differences between groups after treatment. Group A improve more balance as compared with group B.

Table 4: Between groups difference of Berg Balance Scale at baseline and after treatment

Outcome Measure	Treatment Groups				T	p-value
	Group A		Group B			
	N	Mean ± SD		Mean ± SD		
FES at Baseline	15	38.733 ± 4.620	15	36.333 ± 6.195	1.203	.239
FES after Treatment	15	45.800 ± 2.883	15	41.600 ± 5.288	2.700	.012

Table 5 depicts TUG at baseline show mean ±SD of group A (25.200 ±5.608) and group B (23.333 ±5.614) with t value

DOI: https://doi.org/10.54393/tt.v4i04.175

(.911) and p-value (.370) shown non-significant differences between groups at baseline. After treatment mean ±SD of group A (13.466 ±3.461) and group B (16.933 ±3.555) with t value (-2.706) and p-value (.011) shown significant differences between groups after treatment. Group A improves more mobility as compared with Group B.

Table 5: Between groups difference of times Up and Go at baseline and after treatment

Outcome Measure	Treatment Groups				T	p-value
	Group A		Group B			
	N	Mean ± SD		Mean ± SD		
TUG at Baseline	15	25.200 ± 5.608	15	23.333 ± 5.614	.911	.370
TUG after Treatment	15	13.466 ± 3.461	15	16.933 ± 3.555	-2.706	.011

Table 6 shows FES at baseline show mean ±SD of group A (54.533 ±3.204) and group B (54.000 ±2.725) with t value (.491) and p-value (.627) shown non-significant differences between groups at baseline. After treatment mean ±SD of group A (34.200 ±3.144) and group B (38.266 ±6.681) with t-value (-2.133) and p-value (.042) shown significant differences between groups after treatment. Group A reduces more risk of fall than group B does.

Table 6: Between groups difference of Fall Efficacy Scale at baseline and after treatment

Outcome Measure	Treatment Groups				T	p-value
	Group A		Group B			
	N	Mean ± SD		Mean ± SD		
FES at Baseline	15	54.533 ± 3.204	15	54.000 ± 2.725	.491	.627
FES after Treatment	15	34.200 ± 3.144	15	38.266 ± 6.681	-2.133	.042

DISCUSSION

Stroke is a very common issue caused due to different etiology particularly due to High BP or aneurysm which cause hemiplegia, quadriplegia and hemiparesis which in return cause patient restricted to mobility and other works and patient become bed ridden and they have to use an ambulatory device to move and fro [2]. The objective of this study was to determine the effects of transfer techniques or routine physical therapy to prevent fall from wheelchair in private and public hospitals of Faisalabad and their comparison. Rice et al., reported that falls are complex and most manual wheelchair users need assistance to recover. Comprehensive programs including education on prevention and post fall management are needed [19]. The present study was designed to determine the effects of transfer techniques and routine physical therapy and compared their effects to prevent the fall from wheelchair. In 2020, Koyama et al., found that the lateral transfer improved the degree of independence and reduced the degree of assistance, even in participants who had a similar degree of lower-limb motor paralysis. The lateral transfer method is simple, and its use could contribute to the reduction of injuries sustained by careers as a result of their work [20]. In the present study the results showed that transfer techniques were found to be more effective in fall prevention than the routine physical therapy. Significant differences in results were seen after the treatment in Fall Efficacy Scale (FES). According to Galarneau et al., rehabilitative services should be provided to the patient with the objectives of maximizing their safety, independence, and the quality of their movement. Therapies are administered to the patient in order to teach them independent mobility and self-care skills [21]. In present study although the group received routine physical therapy session showed significant improvement ($p<0.05$) but a significant difference was present between the results of transfer techniques and routine physical therapy. Transfer techniques were found to be more effective in fall prevention than routine physical therapy. The study's strength lies in its randomized clinical trial design, which allows for a rigorous examination of the effects of transfer techniques and routine physical therapy. The use of standardized assessment tools such as the Time Up and Go test, Balance Berg scale, and Fall Efficacy Scale adds validity to the study's outcomes. The statistical analyses using SPSS version 26 contribute to the reliability of the results. The study's focus on a clinically relevant issue, such as fall prevention in stroke patients, adds practical value to the findings and their potential applicability in healthcare settings.

CONCLUSIONS

In conclusion, both transfer techniques and routine physical therapy were effective in fall prevention. But transfer techniques were found to be more effective in fall prevention than only the routine physical therapy and significant differences in the results were seen after the treatment in Fall Efficacy Scale (FES).

Acknowledgement

We would like to acknowledge our research supervisor for his continuous support and guidance throughout the research.

Authors Contribution

Conceptualization: AK, PS
Methodology: MY
Formal analysis: DB
Writing-review and editing: UA, TG, KS
All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article.

DOI: https://doi.org/10.54393/tt.v4i04.175

REFERENCES

[1] Murphy SJ and Werring DJ. Stroke: Causes and Clinical features. Medicine.2020 Sep; 48(9): 561-6. doi: 10.1016/j.mpmed.2020.06.002.

[2] Johnson W, Onuma O, Owolabi M, Sachdev S. Stroke: A Global Response is Needed. Bulletin of the World Health Organization.2016 Sep; 94(9): 634. doi: 10.2471/BLT.16.181636.

[3] Rowe FJ. Stroke survivors' views and experiences on impact of visual impairment. Brain and Behavior. 2017 Sep; 7(9): e00778. doi: 10.1002/brb3.778.

[4] Feske SK. Ischemic stroke. The American Journal of Medicine. 2023 Jun; (64): 1-9.

[5] Rawla P, Vellipuram A, Khatri R, Maud A, Rodriguez GJ, Cruz-Flores S. trends in acute ischemic stroke hospitalizations by age groups, length of stay, mortality and hospital costs in the United States from 2000-2014. Stroke. 2019 Feb; 50(Suppl_1): AWP212-AWP. doi: 10.1161/str.50.suppl_1.WP212

[6] Montaño A, Hanley DF, Hemphill III JC. Hemorrhagic stroke. Handbook of Clinical Neurology.2021 Jan; 176: 229-48. doi: 10.1016/B978-0-444-64034-5.00019-5.

[7] Unnithan AKA and Mehta P. Hemorrhagic stroke. Europe PMC.2020 Jul.

[8] Ruíz CAG. Prevalencia de alteraciones morfológicas electrocardiográficas en el servicio de urgencias en pacientes con evento cerebral isquémico y con terapia trombolítica. Facultad de Medicina. 2018 Dec.

[9] Amarenco P. Transient ischemic attack. New England Journal of Medicine. 2020 May; 382(20): 1933-41. doi: 10.1056/NEJMcp1908837.

[10] Lioutas VA, Ivan CS, Himali JJ, Aparicio HJ, Leveille T, Romero JR, et al. Incidence of transient ischemic attack and association with long-term risk of stroke. Jama. 2021 Jan; 325(4): 373-81. doi: 10.1001/jama.2020.25071.

[11] Stinear CM, Lang CE, Zeiler S, Byblow WD. Advances and challenges in stroke rehabilitation. The Lancet Neurology. 2020 Apr; 19(4): 348-60. doi: 10.1016/S1474-4422(19)30415-6.

[12] Chang K, Zhang H, Xia Y, Chen C. Testing the effectiveness of knowledge and behavior therapy in patients of hemiplegic stroke. Topics in Stroke Rehabilitation.2011 Sep; 18(5): 525-35. doi: 10.1310/tsr1805-525.

[13] Miyamoto S, Ogasawara K, Kuroda S, Itabashi R, Toyoda K, Itoh Y, et al. Japan stroke society guideline 2021 for the treatment of stroke. International Journal of Stroke. 2022 Oct; 17(9): 1039-49. doi: 10.1177/17474930221090347.

[14] Gavin-Dreschnack D, Nelson A, Fitzgerald S, Harrow J, Sanchez-Anguiano A, Ahmed S, et al. Wheelchair-related falls: Current evidence and directions for improved quality care. Journal of Nursing Care Quality.2005 Apr; 20(2): 119-27. doi: 10.1097/00001786-200504000-00006

[15] Zanotto T, Sosnoff JJ, Backus D, Yarnot R, Abou L, Peterson EW, et al. Characteristics and consequences of falls among people with multiple sclerosis who use wheelchairs or scooters: Differences between injurious and non-injurious falls. Multiple Sclerosis and Related Disorders. 2023; 73: 104631. doi: 10.1016/j.msard.2023.104631.

[16] Singh H, Scovil CY, Bostick G, Kaiser A, Craven BC, Jaglal SB, et al. Perspectives of wheelchair users with spinal cord injury on fall circumstances and fall prevention: a mixed methods approach using photovoice. PloS One. 2020 Aug; 15(8): e0238116. doi: 10.1371/journal.pone.0238116.

[17] Sutton D and McCormack S. Fall prevention guidelines for patients in wheelchairs or patients with delirium: A review of evidence-based guidelines. Europe PMC. 2019 Sep.

[18] Chang WP and Jen HJ. Comparison of risk factors of falling for psychiatric inpatients and general ward inpatients who had fallen. Journal of the American Psychiatric Nurses Association. 2023 Jul; 29(4): 328-37. doi: 10.1177/10783903211033028.

[19] Rice LA, Peters J, Sung J, Bartlo WD, Sosnoff JJ. Perceptions of fall circumstances, recovery methods, and community participation in manual wheelchair users. American Journal of Physical Medicine & Rehabilitation. 2019 Aug; 98(8): 649-56. doi: 10.1097/PHM.0000000000001161.

[20] Koyama S, Tanabe S, Saitoh E, Otaka Y, Ohta H, Tatemoto T, et al. Comparison of two methods of bed-to/from-wheelchair transfer in patients with hemiparetic stroke. Fujita Medical Journal. 2020; 6(3): 81-6.

[21] Galarneau L. An interdisciplinary approach to mobility and safety education for caregivers and stroke patients. Rehabilitation Nursing. 1993 Nov; 18(6): 395-9. doi: 10.1002/j.2048-7940.1993.tb00796.