

# Outcome of the Gait Rehabilitation in the Stroke Patients by Gait Assessment and Intervention Tool

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**Received:** 003-Jun-2022,

Manuscript No. AMHSR-22-65293;

**Editor assigned:** 07-Jun-2022,

Pre QC No. AMHSR-22-65293(PQ);

**Reviewed:** 22-Jun-2022,

QC No. AMHSR-22-65293;

**Revised:** 28-Jun-2022,

Manuscript No: AMHSR-22-65293(R);

**Published:** 04-Jul-2022,

**DOI:** 10.54608.annalsmedical.2022.60

## Abstract

**Objective:** To determine the outcome of the gait rehabilitation in the stroke patients by Gait Assessment and Intervention Tool. **Methodology:** This quasi-experimental study was on pre-post-test model conducted during academic years 2020-21. The sample size was 47 and patients with diagnosed ischemic stroke were recruited in a single group using non-probability convenience sampling. The severity and duration of the condition were measured. All patients were gone through the measurements and the tool used for the purpose was Gait Assessment and Intervention Tool (GAIT). The Paired sample t-test was used for the data analysis on SPSS version 17. **Results:** This quasi-experimental study was on pre-post-test model conducted during academic years 2020-21. The sample size was 47 and patients with diagnosed ischemic stroke were recruited in a single group using non-probability convenience sampling. The severity and duration of the condition were measured. All patients were gone through the measurements and the tool used for the purpose was Gait Assessment and Intervention Tool (GAIT). The Paired sample t-test was used for the data analysis on SPSS version 17. **Conclusion:** There was a significant role of gait rehabilitation in stroke patients and improvement in gait training was accurately identified through GAIT measuring scale in stroke patients with gait deficit.

**Keywords:** Gait; Gait assessment and intervention tool; Stroke; Physical Therapy

## Introduction

Stroke can occur due to mainly two reasons that are either bursting of the blood vessel (hemorrhagic) or the blood vessel is blocked by a clot (ischemic), due to which nutrients and oxygen supply stops to the brain, which results in disability or death can occurs. Its further effects are variable that includes impairment in motor and sensory systems, emotion, language, perception, and cognitive function. Stroke presentation mainly depends on the damaged brain part. If a motor function is impaired, then it includes paralysis or paresis of the muscles on the side of the body contralateral to the side of the lesion [1]. It affects the arm, leg, or face. (2-4) In stroke patients, the pattern of gait deviates from the normal is and seen both in involved and uninvolved lower extremities (L.E) [2-4]. Gait changes that occur in stroke patients involve temporal and distance factors [5]. Gait consists of two phases named as swing phase and stance phase [6,7]. In people having a stroke, both of the phases become abnormal [8,9].

In earlier years of stroke rehabilitation, the focus was on preventing complications associated with stroke and also minimizing after-effects of stroke. Therefore, range of motion exercises was considered a major treatment for stroke patients. With advancements in physiotherapy knowledge and practice, various techniques came into practice [10-13]. Different types of stretching, range of motion exercise, manual weight-bearing postural training, modalities like electrical muscle stimulator, transcutaneous electrical nerve stimulator, and even heat therapy

such as shortwave diathermy and infra-red have been long used. With further advancement, focus came from static training to dynamic training. This made the basis for early walk training after stroke [13,14]. Balance training and conditioning lost senses with spared senses were other options [15].

The GAIT scale consists of thirty-one things with maximum scoring of sixty-four, it is divided into three parts which involve gait phases swing and stance related gait components of the trunk, upper extremity and lower extremity that compose walking. The GAIT scale also measures specifically deficits present in sub-classes related to gait phases swing and stance. Main advantage about GAIT is that it measures concisely intervention response which helps physiotherapist to rationalize to intervention and continue it has gains in gait in stroke patients. The GAIT is vulnerable for the stroke patients to perceive their upturn in light of multi-interventional method of the step recovery and patient were assessed with the assistance of this device.

The rationale of my study is to obtain significant gain by physiotherapy gait training and to increase the awareness about

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**How to Cite this Article:** Anwar N, et al. Outcome of the Gait Rehabilitation in the Stroke Patients by Gait Assessment and Intervention Tool. Ann Med Health Sci Res. 2022;12: 277-280.

the significance of gait training in stroke rehabilitation by using GAIT scale, in which pre and post treatment scoring was compared.

### Methodology

This quasi-experimental study included 47 participants selected by non-probability convenience sampling conducted during academic years 2020-21. Three participants discontinued the study without notice in the first week of study. Sample size (n) was 50 according to the following formula:

$$n = \frac{(Z_{1-\beta} + Z_{1-\alpha/2})^2 + (\delta_1^2 + \delta_2^2)}{(\mu_1 - \mu_2)^2}$$

Power of study (Z1-β) equal to 90%, level of significance = α = 95% and confidence interval 95.

- Mean difference in gait performance=289
- Proposed STD Deviation in Group A= δ-1=22
- Proposed STD Deviation in Group B= δ2=24

Patient population was taken from the physical therapy department of Fatima Memorial Hospital after taking permission from the respective departments. The inclusion criteria selected patients of all ages, either gender (male or female), newly diagnosed cases of mild & moderate severity of ischemic stroke due to middle cerebral artery on any side of the body (right and left). The exclusion criteria included patients that had a neurological disease affecting gait other than ischemic stroke such as: Hemorrhagic stroke, Parkinson’s and cerebral ataxia. All patients of study were screened for following information before recruitment such as age, stroke index, functional level, gait level, quality of gait and medical history. The consent forms were given to all patients and the confidentiality of patients was highly maintained. Any participant, if refused to participate in the study at any time, his/her decision was respected. Study was commended to institutional review board after the approval from respected committee of Fatima Memorial Hospital.

Each participant was undergone through following procedures at Base Line Measurements: A questionnaire regarding demographic information and GAIT Scale. All patients were treated individually without knowing each other’s treatment time, details and identity. All 47 patients were provided with multi-modal rehabilitation consisting of coordination exercises, strengthening exercises, overground gait training using parallel bars and functional electrical stimulation. Frequent, but equal for all participants, rest intervals of 10 minutes were introduced between the exercises. The sequence and duration of each exercise was planned; however, it was based on patients’ tolerance level and onset of fatigue. Duration of session was consisted of 1.5 hours/session, 4 to 5 days per week for 3 months. Post treatment follow up of patients was taken on third month using GAIT scale. The comparison of pre and post scoring on GAIT scale was done to see the improvement in gait.

The data were entered in SPSS (version 17). To analyze mean differences, parametric tests paired sample t test and independent t-test was used.

### Results

Forty-seven patients (n=47) with ischemic stroke were included in this study which conducted during academic years 2020-21. Histogram shows the age of the patient Figure 1. Demographic data about the patients include gender in which there were males 29 (61.7%) and females 18 (38.3%). Results regarding limb involvement under assessment and treatment showed that there were 22 (46.8%) patients with right limb involvement and 25 (53.2%) with left limb involvement. Results regarding means of assistance in use showed that there were 11 (23.4%) patients who were using assistive devices for support, 19 (40.4%) were using orthotics/ prosthesis for support and 17 (36.2%) as using care giver’s assistance as support in daily life activities as shown in Table 1.

Paired sample test at pre-treatment and post-treatment level showed mean difference for score of Gait Assessment and Intervention Tool (G.A.I.T) as 27.08 ± 7.23 with significant difference of scores (p value 0.000) as shown in Table 2.

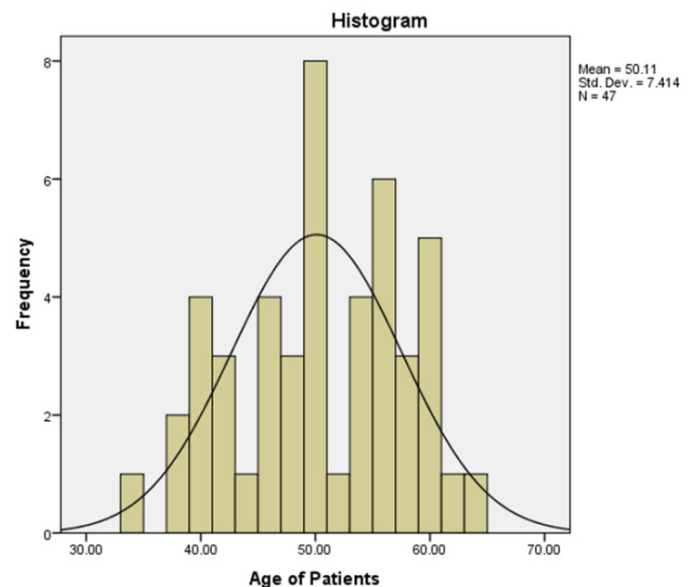


Figure 1: Age of the Patients.

Table 1: Demographic data about the participants (n=47).

	Study Group	Frequency	Percent
Gender of patients	Male	29	61.7
	Female	18	38.3
Limb involved	Right Limb	22	46.8
	Left Limb	25	53.2
Means of Assistance	Assistive Device	11	23.4
	Orthotics/ prosthesis	19	40.4
	Care Giver's Assistance	17	36.2

Table 2: Paired t-test within Group Analysis.

Scale	n	Mean ± SD	P value
Pre-Interventional and Post-Interventional Score of G.A.I.T	47	27.08 ± 7.23	0

**Table 3: Independent t-test for pre and post treatment analysis.**

	Scale	Mean $\pm$ SD	p-Value
G.A.I.T	Pre-Treatment MMT of Hip Extensors	2.40 $\pm$ 0.50	0.07
	Post-Treatment MMT of Hip Extensors	2.94 $\pm$ 0.90	0.13
	Pre-Treatment MMT of Hip Abductors	1.98 $\pm$ 0.79	0.12
	Post-Treatment MMT of Hip Abductors	3.19 $\pm$ 0.85	0.12
	Pre-Treatment MMT of Ankle Dorsiflexors	1.75 $\pm$ 0.61	0.09
	Post-Treatment MMT of Ankle Dorsiflexors	2.51 $\pm$ 0.51	0.07

**Table 4: Paired t-test within group analysis.**

	Scale	Mean $\pm$ SD	p value
G.A.I.T	Pre-Treatment -Post-Treatment MMT of Hip Extensors	0.53 $\pm$ 1.02	0.001
	Pre-Treatment -Post-Treatment MMT of Hip Abductors	1.21 $\pm$ 1.41	0
	Pre-Treatment -Post-Treatment MMT of Ankle Dorsiflexors	0.77 $\pm$ 0.76	0

The comparison of pre and post treatment G.A.I.T values in single group was done using independent sample t test. Pre and post treatment values of Manual Muscle Testing (MMT) for hip extensors, hip abductors and ankle dorsiflexors were: Hip Extensors at pre-treatment were 2.40+0.50 while at post treatment were 2.94+0.90, Hip Abductors at pre-treatment were 1.98+0.79 while that of at post interventional were 3.19+0.85, and ankle dorsiflexors at pre-treatment were 1.75+0.61 while at post-treatment were 2.51+0.51 as shown in Table 3.

Paired samples statistics at pre-treatment and post-treatment level values of mean difference for score of Manual Muscle Testing for: Hip extensors as 0.53+1.02 with significant difference of scores (p value 0.001), Hip Abductors as 1.21+1.41 with significant difference of scores (p value 0.000) and Ankle dorsiflexors as 0.77+0.76) with significant difference of scores (p value 0.000) as shown in Table 4.

## Discussion

In this study, 47 participants having ischemic stroke with any age and disability level were included. Patients with hemorrhagic stroke were not included to the study. The average of the respondents was of elderly age. This mainly relates to the fact that incident of stroke primarily happens in this age. Furthermore, usually risk factors associated with stroke incident in Pakistan becomes damaging in this age such as Hypertension, Diabetes Mellitus Type II, and sedentary life.

In this study, results regarding pre-treatment and post-treatment level showed mean difference for score of GAIT scale as 27.08  $\pm$  7.23 with significant difference of scores (p value 0.000). Just like the current study done a study in 2009 showed that GAIT scoring tool records components of movement which are coordinated before treatment and also measures improvement after treatment. The reliability of GAIT scale both intra-rater and inter rater were good. It shows response to gait rehabilitation in stroke patients.

In this study, paired samples statistics at pre-treatment and post-treatment level showed mean difference for score of Manual Muscle Testing for: Hip extensors as 0.53+1.02 with significant difference of scores (p value 0.001), Hip Abductors as 1.21+1.41 with significant difference of scores (p value 0.000) and Ankle dorsiflexors as 0.77+0.76) with significant difference of scores (p value 0.000). Cohort study in 2012 showed that

measuring tool GAIT had assessment items for ankle, knee and hip during gait phases of swing and stance, therefore it records insufficiency of these components during gait. Thus it helps the therapist to observe changes and improvement before and after gait treatment.

It is need of time to spread awareness among physical therapists regarding assessment and treatment tools available for treatment of different broad range of disorders. One such example has been studied in present study regarding Gait Rehabilitation after stroke by using Gait Assessment and Treatment Tool. There should be series of continuous professional development activities for promotion and education of treatment and assessment tools.

## Conclusion

There was significant role of gait rehabilitation in stroke patients and improvement in gait training was accurately identified through GAIT measuring tool in stroke patients with gait deficit.

## Limitation

There should be further researches with increase sample size and with control group so comparison should be made as this study was a single group Quasi-experimental.

Patients are difficult to find that stay in trial for long days.

## Conflict of Interest

The study has no conflict of interest.

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