

Effect of circuit gait training vs traditional gait training on mobility performance in stroke

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Abstract

Objective of the study was to determine the effect of circuit gait training versus traditional gait training on mobility performance and quality of life in sub-acute and chronic stroke patients. A randomized control trial was conducted and stroke patients of either gender having 2-4 score on Rankin Modified Scale and able to stand 10 seconds were included in study. A total of 32 individuals were randomly assigned into two groups. They were assigned a 40-50 min/session for 3-4 days/week over length of 06 weeks. Berg Balance Scale (BBS), Fall Efficacy Scale (FES) and Stroke Specific Quality of Life Scale (SS-QOL) tools assessed measures of interest. The sample comprise of 16 males and 14 females with mean age of 52.53 ± 12.76 years. After six weeks, significant improvement was recorded in BBS ($p=0.002$). Quality of life and fall risk were also significantly improved and reported using FES ($p=0.004$) and SS-QOL ($p=0.004$). Circuit gait training improves mobility, balance and enhances quality of life in stroke patients.

Keywords: Balance, Circuit gait training, Quality of life, Stroke.

Introduction

Stroke is defined as "neurological deficit ascribed as central nervous system's acute focal deficit". It is considered to be one of the major cause of mortality and disability worldwide.¹ Data estimated by World Health Organization shows that in 2002 almost 5.5 million deaths occurred due to stroke of which 20% were contributed by South Asia.² In the world by 2008 among the most populous countries with an estimated population of 167 million people, Pakistan holds the sixth position.³ There is no significant community based epidemiologic study on stroke from Pakistan. An annual estimate occurrence of stroke in Pakistan is 250/100,000

and will increase to 350,000 new cases per annum.⁴ Having a bird eye view of the major causes of death worldwide, stroke stands 3rd and contributes to the major cause of disability.⁵

Stroke ends up in a variety of signs and symptoms with the major and broadly considered is motor impairment along with related problems.⁶ Approximately 45-73% of stroke patients experience a fall within 6 months of post stroke, prolonging the rehabilitation process. Out of total percentage of stroke survivors worldwide, 25-74% are either completely or partially dependent on assistance to perform their routine life activities.⁷

Neuro-rehabilitation is widely used after stroke. It is implemented as a standard technique involving a combination of different approaches like neuro-facilitation, task specified training and task oriented approach.⁸ In order to focus on gait and incorporate more than one patient at a time, circuit gait training is found more effective and is cost effective as well.⁹

Circuit Training is basically a form of training that contains a chain of working stations specifically designed to gain better results.¹⁰ The current study was planned to compare the mobility performance and quality of life in circuit gait training vs. traditional gait training in stroke patients.

Methods and Results

The study is RCT with random allocation of subjects into groups. Specific inclusion criteria were set for sample collection. Standard treatment was provided to the control group while the interventional group had circuit training. The subjects were assessed at baseline through blind assessors and 06 weeks of training was provided. After training again the subjects were analysed by blind assessors. Under ethical conditions the study was conducted from 1st January to 31st July 2016. The sample size was finalized after review of previous studies. Total 36 patients were assessed for eligibility. Six patients dropped out (02 out of town, 03 financial issue, 1 not willing) and 30 participants were randomly allocated to two groups, Circuit gait training group ($n=15$) and Traditional gait training group ($n=15$).

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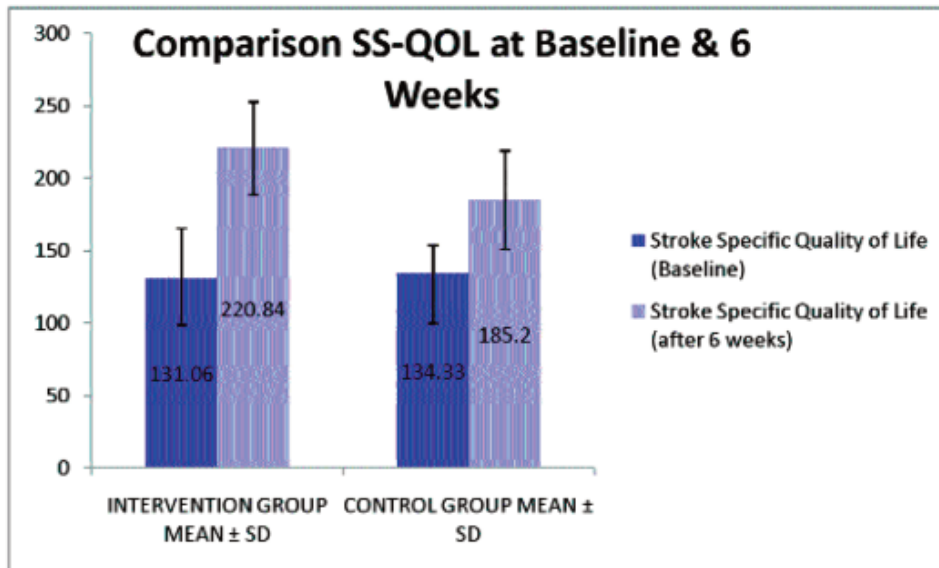


Figure-1: Comparison of stroke specific quality of life at baseline & week 6 between groups.

Stroke patients; 30-70 years age and either gender were included. Co-morbidities like cognitive impairment, communication problem, patients having severe

abnormal synergies and contractures were excluded from the study. Informed consent was taken in a written form. 66.7% participants had ischaemic stroke and among them 55% (n=11) were in interventional group and 45% (n=9) were allocated in control group through randomization. According to artery involved in stroke 21 (70%) of the participants had involvement of middle cerebral artery and were almost equally distributed among the two groups with 10 (47.6%) in interventional group and 11 (52.4%) in control group. Eight (26.7%) had anterior cerebral artery involvement and were

equally distributed among the two groups. Only 1 patient had posterior cerebral artery involvement and was randomly allocated in interventional group. After 6



Figure-2: Collage showing different tasks used in circuit gait training.

Table-1: Independent T-Test Comparison of Berg Balance Scale & Fall Efficacy Scale between Groups.

Variables	CGTG Mean±SD	TGTG Mean±SD	P-Value
BBS 0	31.60 ± 6.62	35.13 ± 9.28	0.241
BBS 2	39.20 ± 6.88	36.73 ± 9.84	0.434
BBS 4	44.69 ± 8.68	38.70 ± 9.5	0.093
BBS 6	51.00 ± 6.39	41.26 ± 8.89	0.002
Fall Efficacy Scale 0	44.86 ± 17.55	55.66 ± 24.72	0.180
Fall Efficacy Scale 6	19.69 ± 14.24	39.33 ± 17.63	0.004

weeks of intervention significant improvement was seen in BBS, FES and SS-QOL scores. Data was collected using valid standardized assessment tools; Berg Balance Scale (BBS) for dynamic balance, Fall efficacy scale (FES) for fall reduction and Stroke specific quality of life scale (SS-QOL) for assessing quality of life. The measurements were taken at baseline, after 2, 4 and 6 weeks for BBS as shown in Table-1. For FES and SS-QOL measurements were taken pre and post intervention (Table-1 & Figure-1). SPSS 21 was used for statistical analysis and the tests used for inferential analysis was Independent sample t-test to compare results across groups.

Treatment protocol: Traditional Group: patients were given traditional gait training exercises for 3-4 days/week, 30-40 minutes/session for 6 weeks. Circuit Gait training group: received circuit training having 10 different circuits for 3-4 days/ weeks, 30-40 min per session for 6 weeks. Activities of balance and gait training were included in the study (Figure-2). All tasks were performed under supervision of the therapist.

Discussion

The current study suggests Circuit gait training to be quite effective in improving both gait and balance along with quality of life as compared to traditional training. A similar study by Kim also showed that in comparison of individual/ task specific gait training, and circuit training was effective in improving gait and balance. A study by Bonggil Kim et al. shows that circuit training in a group shows better result in balance control of stroke patients than in individual training.¹¹

Gait training is thought to be affecting control of balance. Cho & Lee¹² while studying BBS stated that gait training amplifies balance but a prominent difference was seen after 6 weeks.

Schmid et al.¹³ conducted a study on chronic stroke patients to find association between quality of life (QOL) and balance. Outcome measures used were BBS and SS-QOL; results showed that patients with balance impairment showed BBS score of 39±7 and appreciably

worse stroke specific quality of life scores as compared to patients who are not suffering from any balance deficit, concluding that both fall risks and balance impairment are coupled with decreased quality of life scores.

Results of this study also suggest that as the balance improved with circuit gait training, score of fall efficacy scale after 6-week training ($p = 0.003$) also improved showing a reduced chance of fall. Score for SS-QOL after 6 weeks also improved markedly with significant p -value.

Several limitations need to be considered. Mean age difference between groups was almost 05 year that may be a confounding factor for better outcomes in interventional groups so further studies should consider the similar mean age for both groups for better comparison.

Conclusion

In accordance with above results the study concludes that circuit gait training improves both mobility performance and quality of life in patients in comparison with traditional gait training. A better functional performance in return reduces the fear of fall shown by improved score on fall efficacy score. Therefore it is concluded that Circuit gait training is found to be improving quality of life and also promotes social interaction among stroke patients and creates a competitive and supportive environment, further enhancing their abilities and confidence.

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Conflict of Interest: None.

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