Research Article

Journal of
Experimental Stroke and
Translational Medicine

The effects of a task-oriented walking interventions on balance in chronic stroke patients

Aysha Khan[1], Amna Yaseen[2], Malik Muhammad Atif[3], Farjad Afzal[3*], Azfar Khurshid[4]

[1]Aysha Khan, Physiotherapist Islamia hospital Chiniot
[2]Senior lecturer Riphah International University Islamabad
[3]University of Sargodha, Department of Allied Health Sciences
[4]Lecturer Bakhtawar Amin medical and dental college Multan

*Author for correspondence: Farjad Afzal, Department of Allied Health Sciences, University of Sargodha, Pakistan.
E-mail: afzalfarjad@gmail.com

Received date: February 01, 2021
Accepted date: February 10, 2021
Published date: February 23, 2021

Abstract:

Stroke is a neurological insufficiency which causes major motor deficits particularly in lower limbs. Task oriented walking intervention is a novel approach used for stroke rehabilitation. The purpose of this research study was to compare the effects of the task oriented walking interventions with the conservative rehabilitation for improvement of balance in the chronic stroke patients. The study was a randomized control trial, conducted in hospital settings. 48 patients with predefined inclusion and Exclusion criteria were selected. Subjects were randomly allocated into 2 groups. After obtaining consent, data was collected via self-structured questionnaire, 06 minutes-walk test, Timed "Up and Go" test, and Berg Balance Scale. Group one received Task-Oriented Walking Intervention interventions and conventional treatment while control group received conventional interventions only. Data was analyzed by SPSS version 24. The results showed that, there were 54% males and 46% females. After 6 weeks of intervention experimental group receiving task oriented training along with conventional interventions showed significant improvement in balance with P-value <0.005 for all the three scales TUG, BBS and 6MWT as compared to the control group receiving only conventional interventions. Our respective study concluded that patients who were receiving task oriented walking interventions had considerable improvement in balance.

Keywords: Balance training ■ Task oriented training ■ Balance ■ Stroke.

Introduction

Stroke is a medical condition in which death of the brain cells occur due to poor blood flow to the cells of the brain [1]. Stroke has been defined in 1970 by World Health Organization (WHO) as a neurological insufficiency of the cerebrovascular cause that can persist after 24 hours or it may be disturbed by the death of the patient within 24 hours or more than 24 hours, or it may cause death with no evident reason [2]. The reasons for stroke may include the vascular insufficiency, cerebral infection, subarachnoid hemorrhage and or intracerebral hemorrhage. Stroke or CVA is considered as a leading cause of death and disability, having durable adverse effects on the affected population [3]. Generally, stroke is a medical condition that occurs due to poor blood flow to the brain and it can cause the damage to the cells of brain and it may also cause the permanent death of the cells of the brain. So, stroke is actually a neurological lesion that can lead to the physical, social, cognitive and other behavioral symptoms [4]. The stroke survivors may suffer from a number of the physical impairments like muscular weakness, loss of motor functions or motor insufficiencies, limited Range of movements, and a complete dependency on others even for basic ADLs [5]. Many patients have to face long lasting disabilities and are unable to make full progress towards their movement and functions ever. The usual outcomes of stroke include the sensory as well as the motor deficits and dysfunctions of the affected extremity but the most frequent are the motor deficits or the dysfunctions

[6]. Stroke survivors who have lower limb dysfunctions or deficits are most influenced in performing the ADLs independently because they are bed ridden or wheel chair bound usually and have many gait and balance issues[7]. Conservative management for stroke may include the rehabilitation which further incorporates the brainstorm methodology, PNF, NDT and many other rehab exercises [8]. Stroke patients who have upper extremity dysfunction are notably susceptible to the issues in performing ADLs due to the motor deficits and the impairments. While the condition is even worse for the patients having lower extremity dysfunctions and usually such patients are bed ridden or wheel chair bound [9]. It is the need of the time to devise and progress new methodologies and strategies for rehabilitation of stroke in order to assist the affected population to achieve high level of the functional and purposeful independence in movement [10]. Task oriented walking intervention is one of the novel approaches and it might be capable of improving the functions of lower extremity motor functions in the people affected with stroke [11].

Task oriented walking intervention is a group of ten interventions which include the interventions designed specifically to improve the lower extremity functional status [12]. In the task oriented walking interventions, the patient is advised to perform the task in the prescribed setup and it provide the chance to effort with the techniques based on the specific tasks by making definite attentiveness and enthusiasm [13]. Recent studies have recommended that the interventions should be task oriented, well demonstrated and repetitive but repetitive movements are difficult to perform because the patients may lack interest and the repetition may lower the motivation level of the patients which is required for the completion of the treatment protocol [14]. This method of treatment includes ten different interventions (walking on a treadmill; standing up, walking to, and sitting down on a chair; kicking a soccer ball against the wall; walking along a balance beam; performing step-ups; walking an obstacle course; walking while carrying an object; walking at maximal speed; walking backwards; and walking up and down stairs) that are primarily intended to improve the mobility of the person affected by stroke [15]. In fact, the main concern of the stroke patients and their family is about the rehabilitation particularly the independence of the patient or in other words independence of the patient to perform the functional activities by self [16].

Material and Methods

It was a randomized control trial with sample size of 48. Sampling technique used in the study was purposive sampling technique. The randomization in the study was done by toss and coin method. Interventional group (n=24) and control group (n=24). The tools used for the assessment were berg balance scale, six minutes' walk test, and timed up and go tests. The settings of this study were DHQ Chiniot, Al- Amin medical complex and Ali hospital Chiniot. Research Ethical Committee (REC) of Riphah College of rehabilitation sciences provided the permission letter for the conduction of study. The baseline pre and post treatment session readings were taken from the both groups, 'experimental and control". The Experimental group was treated with 10 minute warm up exercises and then was provided with the task-oriented walking interventions (for 20-25 minutes) for 3 days a week for 6 consecutive weeks on alternate days. These individuals have received task-oriented walking interventions (walking on a treadmill; standing up, walking to, and sitting down on a chair; kicking a soccer ball against the wall; walking along a balance beam; performing step-ups; walking an obstacle course; walking while carrying an object; walking at maximal speed; walking backwards; and walking up and down stairs) along with conventional physical therapy for 10-15 minutes.

The Control group was treated with 10 minute warm up exercises and then was provided with the conventional physical therapy session including mild to moderate and pain free sustained stretching, Balance training included the side shuffles, leg swings, and arm circles and active and passive ROMs, Wobble board exercise and parallel bars for ambulatory training and exercises for static, dynamic and anticipatory balance were included. This session was given for 40 to 45 minutes. Data was analyzed by SPSS 24. After assessing the normality of the data by Kolmogorov test, Wilcoxon test and Mann Whitney-U test were used for within group analysis. Data was presented in the form of median IQR along with its p values. Figure 1 below show CONSORT Flowchart of participants.

Appendix

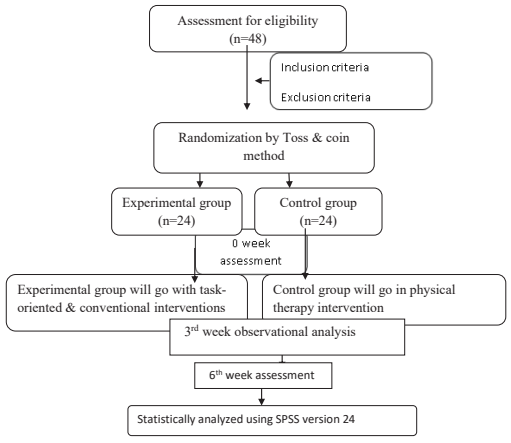

Figure 1: Consort Diagram

Results

It has been found in the results that most of the participants 54% were males and had age between 29 to 57 years. It has also been found that most of the participants, more than 60% belong to the low socioeconomic status. The results also portrayed that almost 65% of the participants were non-smokers while only 35% were smokers. In general, smoking is regarded as one of the risk factors of stroke but this is surprising to know that most participants were non-smokers. This is because merely smoking is not a cause of stroke and it is a multifactorial disorder and smoking has little contribution to the causation of stroke.

The results depicted that the participants of the control group (n=24) have Wilcoxon test P-value >0.005 but the participants of the experimental group (n=24) have Wilcoxon test P-value < 0.005 depicting highly significant results. The Mann-Whitney test also depicted a P-Value of 0.00 that is <0.005 depicting the high significance and also there is great difference among the Mean ranks of the control and the experimental groups showing the better effects of the task oriented walking interventions.

Table 1: Mann-Whitney Test showing intragroup comparison (Pre-Analysis)

Variable:	Group	Mean Rank	P Value	IQR	Median
BBS	Control Experimental	18.63 30.38	0.001	0.75 1.00	1.92 2.54
TUG	Control Experimental	22.00 27.00	0.195	1.75 1.75	2.46 2.88
SMWT	Control Experimental	21.38 27.63	0.089	1.75 1.00	2.08 2.38

This table of Mann Whitney-U test shows Median IQR and p-value of BBS, TUG and 6MWT

*** = p-value >0.0001

Table 2: Mann-Whitney Test showing intragroup comparison (Post-Analysis)

Variable:	Group	Mean Rank	P Value	IQR	Median
BBS	Control Experimental	14.46 34.54	0.000	0.75 1.00	1.83 1.63
TUG	Control Experimental	15.00 34.00	0.000	1.75 2.00	2.38 2.00
6MWT	Control Experimental	16.00 33.00	0.000	1.75 1.00	2.04 1.71

This table of Mann Whitney-U test shows Median IQR and p-value of BBS, TUG and 6MWT

*** = p-value <0.000

Discussion

The results of the current study portrayed that individuals receiving task oriented walking interventions have higher chances of improvement in the equal time duration for the lower extremity. The effects of task oriented walking interventions have already been tabbed by a number of researchers and it was concluded by them that this intervention is vitally helpful and more efficient in improving the balance of the patients with stroke. It was also indicated in the literature that these interventions promote the functional status effectively in comparison to the typical conventional rehabilitation programs. In order to make the patients independent after stroke and making the patient able to perform ADLs (Activities of Daily Living) with ease, the most important factor to be cared is balance. There are a number of the interventions to achieve the base of the independence but task oriented walking interventions can help in achieving this factor easily and effectively [17].

In order to know the effects of the balance on the independence of the patients, a research study "Self-efficacy in relation to impairments and activities of daily living disability in elderly patients with stroke: a prospective investigation" was conducted by Hellstrom, and colleagues. They tried to find out the effects of the as contributing factor to the independence of the stroke patients. 37 post stroke patients having age between 66 to 89 years were taken as sample and FIM (Functional Independence Measure), BBS (Berg Balance Scale) and Falls efficacy scale were used to measure the balance of the post stroke patients taken as sample. The P value was 0.002 for all the results and the P < 0.005 is depicting the high significance of the study. Thus, it was concluded that these walking interventions must be included in the rehabilitation procedure of the stroke patients [18]. Another research study "Effects of Task-Oriented Circuit Class Training on Walking Competency after Stroke" was conducted by Wevers to explore the effects of task oriented walking interventions. Studies up to March 2008 were included in this systematic review. The results favored the task oriented training for walking distance (0.43; 95% CI, 0.17 to 0.68; P<0.001), gait speed (0.35; 95% CI, 0.08 to 0.62; P=0.012), and a timed up-and-go test (0.26; 95% CI, 0.00 to 0.51; P=0.047) [19]. Another study "Task-oriented training in rehabilitation after stroke: systematic review" was conducted by Rensink in 2009 and it was found that the task oriented walking interventions were more effective and have more significant results as compare to the traditional therapies (P<0.005) [20].

Conclusion

It is concluded that patients who were receiving task oriented walking interventions had considerable improvement in balance

while the patients who were in control group who received the conservative rehab treatment, showed less improvement. This research study has proven that the stroke patients get better soon and they improve earlier if the therapy is concise and task oriented.

Conflict of Interest

We hereby confirm that there is no conflict of interest associated with publication.

Acknowledgement

The authors are grateful to the staff of DHQ Chiniot, al Amin medical complex and Ali hospital Chiniot, Pakistan.

Author's Declaration

None to declare.

References

1. Alway D, Cole JW. Stroke essentials for primary care: A practical guide: Springer Science & Business Media (2009).
2. Disorders NIoN, Communications SOo, Liaison P. Stroke: Hope through research: The Institute; (1999).
3. Party ISW. National clinical guideline for stroke: Citeseer (2012).
4. Amarenco P, Bogousslavsky J, Caplan L, Donnan G, Hennerici M. Classification of stroke subtypes. Cerebrovascular diseases. 27(5):493-501(2009).
5. Ward NS, Cohen LG. Mechanisms underlying recovery of motor function after stroke. Archives of neurology. 61(12):1844-8(2004).
6. Arene N, Hidler J. Understanding motor impairment in the paretic lower limb after a stroke: a review of the literature. Topics in stroke rehabilitation. 16(5):346-56(2009).
7. Combs SA, Dugan EL, Passmore M, Riesner C, Whipker D, Yingling E, et al. Balance, balance confidence, and health-related quality of life in persons with chronic stroke after body weight–supported treadmill training. Archives of physical medicine and rehabilitation. 91(12):1914-9(2010).
8. Arya KN, Pandian S, Verma R, Garg R. Movement therapy induced neural reorganization and motor recovery in stroke: a review. Journal of bodywork and movement therapies. 15(4):528-37(2011).
9. Anrather J, Iadecola C. Inflammation and stroke: an overview. Neurotherapeutics. 13(4):661-70(2016).
10. Salbach N, Mayo N, Wood-Dauphinee S, Hanley J, Richards C, Cote R. A task-orientated intervention enhances walking distance and speed in the first year post stroke: a randomized controlled trial. Clinical rehabilitation. 18(5):509-19(2004).
11. Ballington MC. To establish the effect of task oriented group circuit training for people affected by stroke in the public healthcare sector in RSA (2012).
12. Salbach NM, Mayo NE, Robichaud-Ekstrand S, Hanley JA, Richards CL, Wood-Dauphinee S. The effect of a task-oriented walking intervention on improving balance self-efficacy poststroke: a randomized, controlled trial. Journal of the American Geriatrics Society. 53(4):576-82(2005).
13. Van Peppen RP, Kwakkel G, Wood-Dauphinee S, Hendriks HJ, Van der Wees PJ, Dekker J. The impact of physical therapy on functional outcomes after stroke: what's the evidence? Clinical rehabilitation. 18(8):833-62(2004).
14. Kwakkel G. Impact of intensity of practice after stroke: issues for consideration. Disability and rehabilitation. 28(13-14):823-30(2006).
15. Brewer L, Horgan F, Hickey A, Williams D. Stroke rehabilitation: recent advances and future therapies. QJM: An International Journal of Medicine. 106(1):11-25(2013).
16. Kim C-Y, Lee J-S, Kim H-D, Kim J-S. The effect of progressive task-oriented training on a supplementary tilt table on lower extremity muscle strength and gait recovery in patients with hemiplegic stroke. Gait & posture. 41(2):425-30(2015).
17. Salbach NM, Mayo NE, Robichaud-Ekstrand S, Hanley JA, Richards CL, Wood-Dauphinee S. Balance self-efficacy and its relevance to physical function and perceived health status after stroke. Archives of physical medicine and rehabilitation. 87(3):364-70 (2006).
18. Hellstrom K, Lindmark B, Wahlberg B, Fugl-Meyer AR. Self-efficacy in relation to impairments and activities of daily living disability in elderly patients with stroke: a prospective investigation. Journal of rehabilitation medicine. 35(5):202-7(2003).
19. Wevers L, Van De Port I, Vermue M, Mead G, Kwakkel G. Effects of task-oriented circuit class training on walking competency after stroke: a systematic review. Stroke.;40(7):2450-9(2009).
20. Rensink M, Schuurmans M, Lindeman E, Hafsteinsdottir T. Task-oriented training in rehabilitation after stroke: systematic review. Journal of advanced nursing. 65(4):737-54(2009)