Effectiveness of Dual-Task Exercise Training on Gait, Balance and walking speed among Stroke patient

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ABSTRACT

Stroke is a significant medical condition and the significant inception of baffling longstanding inability everywhere in the world. Enduring over 24 hours or causing demise and the reason must be of a vascular starting point to affirm the stroke diagnosis. So the present study aims to the effectiveness of Dual-Task Exercise Training on Gait, Balance and walking speed among Stroke patient at Saveetha Medical College and Hospital. A quantitative approach with Pre-Experimental research with one group pre-test post-test design adopted to conduct the study among 30 antenatal mothers who were selected by non-probability purposive sampling technique. The semi-structured interview method was used to collect the demographical variables among stroke patient, and the patient’s balance and gait pattern were assessed by using the Tinetti Assessment Scale. The results of the study show that in the pre-test, the mean value is 17.7%, and the standard deviation is 3.333. And in post-test, the mean value is 19.866, and the standard deviation is 2.75. The mean difference between pre and post-test is 15.27. This study proves Effectiveness of Dual-Task Exercise Training on Gait, Balance and Walking speed among Stroke patient is effective method to prevent and to improve the Gait, Balance and Walking speed among stroke patient and also it helps the stroke patient to improve to the knowledge and to provide the better quality of life to stroke patient.

INTRODUCTION

Stroke is a significant medical condition and the significant inception of baffling longstanding inability everywhere in the world. It is characterized as the immediately evolved clinical manifestations and additionally indications of significant changes of cerebral function. Enduring over 24 hours or causing demise and the reason must be of the vascular starting point to affirm the stroke diagnosis. Likewise, it is thought about the third reason of death and the first of obtained adult disability globally. Stroke prevalence is dependent on age and sexual orientation. Furthermore, it is accounted for to be 1% the populace. It is expected that in 2030 the Stroke event will be 23 million first historically speaking strokes while demise rate will be 7.8 million stroke deaths. Nations in Eastern Europe, North Asia, focal Africa and the south pacific experiencing the most extreme stroke mortality and stroke trouble. (Hiyamizu et al., 2012)

Although different examinations on feed-in youthful included subjects from second to a fourth or fifth decade, when all is said in done, stroke in youthful
incorporates subjects falling under the age gathering of 15-45 years. The aetiology may change with various age gatherings; however, the majority of the danger factors are basic to all age gatherings. Still, certain elements are limited to the young. Stroke influencing the youthful has conceivably destroying results on the individual his family and the general public by and large. A few examinations have dissected the danger elements of stroke in youthful. Yet, thinking about its effect on a younger age. It needs more examinations for reads for recognizable proof and adjustment of danger factors. (Liu et al., 2017)

Cerebrovascular disease-related death rates have been expanding, and 1 out of each 4 cerebrovascular ailment patients dies inside a month after the beginning of the malady. Among the enduring patients, 15-30% turns out to be seriously impaired. Also, 40% are left with functional deficiencies bringing about issues with the significant segments of useful freedom: engine, tangible and intellectual capacities. Day by day, living requires parity and strolling capacity while performing different undertakings. Along these lines, adjusting and walk preparing for hemiplegic stroke patients ought to mirror the engine abilities and psychological capacity required in day by day living double undertakings. (Shin and An, 2014)

Stroke is a cerebrovascular disease wherein blockage, or injury happens in the cerebrovascular area, bloodstream, prompting harm of neurons because of interference of oxygen and supplement flexibly. It is the most well-known type of Acquired mind injury and results in incapacity and demise all through the world. (Falbo et al., 2016) The parts of inability brought about by stroke vary contingent upon the degree and area of mind injury, yet by and large incorporate equalization weakness, psychological hindrance, tangible disability, engine debilitation, temperament impedance and brokenness of the upper and lower limits causing an issue, for example, a decline in limit with regards to dynamic exercise and loss of portability. Proper recuperation of hemiplegic stroke patients is related with significant expenses and elevated level of exertion, be that as it may, even with treatment, long haul practical and physical handicaps can persevere and patients may show trouble in autonomous strolling when they re-visitation of their homes and networks. Recuperation of strolling capacity specifically, legitimately influence patients endeavours to re-visitation of their way of life before stroke, to carry on with an autonomous life and to partake in social exercises. In this manner, numerous examinations have been done on different intercessions for the recuperation of autonomous strolling. (Yang et al., 2007)

Movement includes motor abilities, but on the other hand, is dependent on sensory and cognitive systems. There is likewise proof that some more established individuals quit strolling when they talk and that this wonder predicts defenselessness to falling. A variety of physiotherapy intercessions improve useful results, in any event, when applied late after stroke. These discoveries challenge the idea of a level in the functional recovery of patients who had encountered stroke and ought to be esteemed in arranging network recovery administrations. Trunk restoration works out, balance preparing, muscle reinforcing is primary for post-stroke patients for International Journal of Neurologic Physical Therapy (2019) recovery of parity and improvement in step and is a significant segment. (Hofheinz et al., 2016)

Numerous therapeutic approaches for the recovery of stride are valuable after stroke. Out of which double undertaking (DT) preparing and task situated preparing program is being utilized. Intellectual engine and double-engine undertakings assume significant parts in everyday life: strolling while at the same time talking, utilizing a cell phone, conveying a sack or watching. (Plummer-D’Amato et al., 2012)

It has been recommended that double undertaking preparing may have more noteworthy adequacy for improving double assignment execution contrasted with single errand preparing. Stride related double undertaking shortages persevere in-network staying stroke survivors numerous months after release from recovery. Undertaking focused preparing includes an assortment of practices to assist patients with determining ideal control methodologies for tackling engine issues. (Agmon et al., 2015) During task arranged preparing, numerous sorts of development are drilled, to restrict compensatory developments and increment versatile movements. It is a strategy which centres around explicit utilitarian undertakings related to the musculoskeletal and neuromuscular frameworks and step related errands are worked on utilizing a practical methodology. Undertaking focused preparing initiate more noteworthy improvement in strolling competency in individuals with stroke. (Kim et al., 2014a)

Beneficial ways to deal with strolling improvement for stroke patients have included orderly the remedial preparing techniques, for example, augmented reality preparing, power stage biofeedback, and treadmill preparing. (Sengar et al., 2019) All the
more as of late, double assignment preparing during which patients with neurologic harm, for example, stroke, perform both engine errands and intellectual undertakings identified with step work has become the principal focal point of examination in this field. Bowen et al. estimated the stride boundaries of stroke patients in a single assignment (strolling) and Dual errand (Listening and replying with strolling) conditions and detailed a critical diminishing in step speed and double undertaking conditions contrasted with single errand conditions. (Choi et al., 2015)

The purpose of the study [1] To assess the pre-test level of gait, balance and walking speed among stroke patient at SMCH. [2] To determine the effectiveness of dual-task exercise upon gait, balance and walking speed among stroke patient at SMCH. [3] To associate the post-test level of gait, balance and walking speed with selected demographic variables among stroke patients at SMCH.

MATERIALS AND METHODS

A quantitative research approach with Pre-Experimental research design with one group pre-test post design was used to conduct a study at Saveetha Medical College and Hospital. Thirty samples were selected using a purposive sampling technique. The inclusion criteria for clients with stroke leading to hemiparesis, a client willing to participate, a client who knows English and Tamil language, a client was having gait and balance problem 30-60 years, a client who has GCS score is more than 13, a client who is having a motor score is more than 5.

The exclusion criteria for the client not willing to participate, a client who can’t understand English and Tamil language, a client with stroke who is not having gait and balance problem, a client who is not available at the time of data collection, a client who have GCS score is less than, a client who is having a motor score is less than 5.

The data collection period was done with prior permission from the Director of Saveetha Medical College and Hospital. The purpose of the study was explained to the samples and written informed consent was obtained from them. The demographic data were collected, structured interview questions regarding stroke, and then he will be assessing the stroke patient Balance, Gait and Walking speed with the use of BarthelIndex Scale & Gait and Balance Assessment Scale (Tinetti Assessment Scale). After that, the stroke patient will able to monitor one week.

RESULTS AND DISCUSSION

Sample characteristics

Among 30 samples, study results regarding age 6.67% (2 members) are in the age group of 30 - 40 years, 26.67. Regarding age 6.67% (2 members) are in the age group of 30 – 40 years, 26.67 % (8 members) are in the age group of 40 – 50 years, 43.33 % (13 members) are on the age group of above 50 -60 years, 23.33% (7 members) are on the age group of above 60 years. Regarding sex, 73.33 % (22members) of samples are male patients, and 26.67 % (08 members) of samples are female patients. Regarding educational status, 13.33 % (4 members) of patients have not studied a formal education.46.67% (14 members) of patients are primarily educated (1st to 5th std), 20 % (6 members) of patients are secondarily educated (6th to 12th std), 16.67% (5 members) of patients educational status is a diploma, 3.33% (1 member) educational status is graduate. Regarding occupational status, 46.67. % (14 members) of patients are sedentary workers, 23.33% (7 members) of patients are moderate workers, and 30% % (9 members) of patients are heavy workers.

Regarding religion, 73.33 % (22 members) of patients are Hindu, 13.33 % (4 members) of patients are Muslims, and 13.33 % (4 members) of patients are Christians. Regarding marital status, 83.33 % (25 members) of the patient is married, 6.67 % (2 members) of patients are unmarried, and 10% (3 members) of patients are a widow. Regarding family income 6.67% (2 members) of patients is earning Rs 3000 to 5000 per month, 13.33% (4 members) of patients earn Rs 5000 to 10000 per month, 80% (24 members) of patients earn above 10,000. Regarding nutritional status 10% (3 members) of patients are vegetarian, 90% (27 members) of patients are non-vegetarian.

Frequency and percentage distribution of pre-test and post-test level of dual-task exercise among patients with stroke

Pre-test results reveal the effectiveness of dual-task exercise on gait balance and walking speed of stroke patient before giving interventions. Findings of pre-test analysis reveal that the majority 60% (18 members) of patients had a high risk for fall and 40% (12 members) of patients had a low risk for fall. Post-test results reveal the effectiveness of dual-task exercise on gait balance and walking speed of stroke patient after implementing the interventions. Findings of post-test analysis reveal that majority 73.33% (22 members) of patients had a low risk for fall and 26.67% (8 members) of patients had a high
Table 1: Frequency and percentage distribution of pre-test and post-test level of dual-task exercise among patients with stroke. N = 30(15+15)

<table>
<thead>
<tr>
<th>Level of risk for fall</th>
<th>Pre-test Frequency</th>
<th>Percentage</th>
<th>Post-test Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High risk for fall</td>
<td>18</td>
<td>60%</td>
<td>8</td>
<td>26.67%</td>
</tr>
<tr>
<td>Low risk for fall</td>
<td>12</td>
<td>40%</td>
<td>22</td>
<td>73.33%</td>
</tr>
</tbody>
</table>

Table 2: Comparison of pre-test and post-test level of dual-task exercise among patients with stroke.

<table>
<thead>
<tr>
<th>Level of risk for fall</th>
<th>Mean</th>
<th>S.D</th>
<th>Mean Difference</th>
<th>Paired ‘t’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>17.7%</td>
<td>3.333</td>
<td></td>
<td>P&lt;0.0001</td>
</tr>
<tr>
<td>Posttest</td>
<td>19.866</td>
<td>2.750</td>
<td>29</td>
<td>t=7.7404 Df=29</td>
</tr>
</tbody>
</table>

S.D = Standard deviation, P<0.0001, Df= degree of freedom, t = paired t-test, S = Significant

risk for fall. (Table 1)

Comparison of pre-test and post-test level of dual-task exercise among patients with stroke

The mean, standard deviation, mean difference paired t-test value of pre and post-test. In the pre-test, the mean value is 17.7%, and the standard deviation is 3.333. And in post-test, the mean value is 19.866, and the standard deviation is 2.75. The mean difference between pre and post-test is 15.27. Through the level of risk for fall on gait balance and a walking speed of stroke patient, there is a significant improvement in mean and standard deviation in post-test than pre-test. The paired t-test value is 7.7404. The value is said to be extremely significant. (Table 2)

Association of the post-test level of dual-task exercise with selected demographic variables among patients with stroke

Association of the post-test level of risk for fall regarding dual-task exercise on gait balance and a walking speed of stroke patient with their selected demographic variables. Chi-square was calculated to find out the association between post-test scores regarding dual-task exercise on gait balance and a walking speed of stroke patient with their selected demographic variables.

The non-Significant association was found between the post-test level of risk scores regarding dual-task exercise on gait balance and walking speed of stroke patient with the selected demographic variables such as Age, Education status, Occupational status, Religion, Marital status, Family income, Nutritional status and Gender is significant.

The present study was supported by Kim et al. (2014b) to inspect the adequacy of a double undertaking put together exercise program concerning strolling capacity in subjects with persistent stroke. Twenty patients determined to have stroke taken an interest in this investigation. All members were accepting a conventional recovery program five days every week. Double undertaking and single-task preparing were furthermore performed for about a month, three days per week. The Stroop test, Timed Up and Go (TUG) test, 10-Meter Walk Test (10MWT), and Figure-of-8 Walk Test (F8WT) were utilized to gauge psychological and strolling capacities and were assessed multiple times (when preparing and at the 2-week development). [Results] Dual-task preparing improved intellectual and strolling capacities, and double errand preparing subjects’ exhibition was superior to single-task preparing subjects’ presentation. Furthermore, these preparation benefits were kept up for two weeks.

CONCLUSIONS

This study proves that the dual-task training program was effective in improving balance and gait pattern. So the dual-task exercise was effective in improving gait and balance of stroke patients, and also it helps the stroke patients to improve to the knowledge and to provide a better quality of life to stroke patient.

Conflict of interest

The authors declare that they have no conflict of interest for this study.

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