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Effect of Dual Task Training To Improve Balance among Geriatric Population

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ABSTRACT

Dual task training is an intervention done by performing two activities with different goals simultaneously. The aim of this study is to determine the effect of dual task training to improve balance among geriatric population.The study design was a pre and post-test experimental design that took place in Divine oldage home. The Berg's Balance Scale was used to find out imbalance in elderly. The present study is a clinical trial of 30 elderly people with imbalance who were allocated to control and experimental groups. The experimental group consisted of 15 patients who received 24 sessions of Dual Task Training as intervention whereas the control group received conventional occupational therapy. The post-test values were taken to record the outcome of the intervention. The results showed that the comparison of pre and post-test mean Berg's Balance Scale scores of the experimental group were highly statistically significant (p value of 0.04236), as compared to the control group because of the effectiveness of Dual task training as intervention.

Keywords: Balance, Geriatric population, Dual Task Training.

INTRODUCTION

Balance can be defined as the ability of an individual to successfully maintain the position of their body in space more specifically maintaining the center of gravity within the base of support. Balance is achieved by the complex integration between the sensory and the musculoskeletal system. Due to ageing the sensory, motor and adaptive components of balance become vulnerable as an accumulated exposure to degenerative, infective and injurious process and so elderly are more likely to developed balance impairment and are at a high risk of falls.

Occupational therapist work with elderly to facilitate optimal occupational performance and community participation across full spectrum of ability. OTs prescribes various activities to meet up the problems faced by elderly. The activity will be graded gradually from simple to complex as the client achieves the fixed goal of the given activity. Occupational therapist will suggest home modifications such installation of grab bars, non slippery flooring, using non skit mats etc. to prevent the possibility of fall. Occupational therapist may also recommend assistive devices such canes, walkers to provide stability during functional mobility.

Dual task training can defined as the performance of two individual tasks simultaneously and have identifiable separate goals. It can be given as motor - motor task or motor - cognitive task. Practicing dual tasks that are performed in our daily life by repetition helps a person to learn it automatically and use it effectively.

AIM

To find the effectiveness of dual task training to improve balance among geriatric population.

OBJECTIVES

- To select the sample of geriatric population who has balance impairment.

- The Mini Mental Status Examination scale was used as screening tool
- The sample was selected using Bergs Balance Scale.
- To find out the effectiveness of dual task training activities in experimental group with Bergs Balance scale

RESEARCH HYPOTHESIS

There is a significant improvement in balance for elderly with imbalance after using Dual task training so, alternative hypothesis was accepted.

METHODOLOGY

Research Design:
Quantitative research, Quasi experimental design.

Sample Technique:
- A convenient sampling technique was used.
- **Sample size :** 30 subjects
- 15 in the experimental group
- 15 in the control group
- **Sample setting:** Divine old age home.

Selection Criteria:
Inclusion Criteria:
- The study includes elderly with balance impairment.
- The study includes elderly in the age range between 60- 95 years.
- The study includes both male and female subjects.
- The study includes elderly who has scored above 24 in MMSE.
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Exclusion Criteria:
- The study excludes elderly with other neurological and orthopaedic conditions.
- The study excludes elderly person with cancer and other inflammatory conditions.

Duration:
The duration of the study was 24 sessions for 3 months. Every session consists of 45 minutes to 1 hour of intervention.

Procedure:
The samples were selected for the study from Divine Old age home. The purpose of this study was explained in detailed and an institutional consent form was obtained from the institution. Totally 30 subjects were selected under inclusion criteria the subjects functional balance was measured with Bergs Balance Scale. All the 30 subjects were measured using Bergs Balance Scale to get the pre-test value then divided equally. 15 sample in control group and 15 sample in experimental group.

Intervention Protocol:
The goal of this study is to analyse the effect of dual task training to improve balance among geriatric population. The participants were given an introduction about Dual task training which consist of doing two tasks, a primary task and a secondary task simultaneously. The primary tasks were balance related gross motor activities and the secondary tasks were fine motor activities.

Primary task (Gross motor for balance)	**Secondary task (Fine motor)**
Sitting	Opening jar cap
Standing	Clipping activities
Turning back	Holding water bottle
Standing with foot together	Shuffling cards
Tandem standing	Fixing nut and bolt
One leg standing	Squeezing a sponge ball
Bending down	Picking up coins

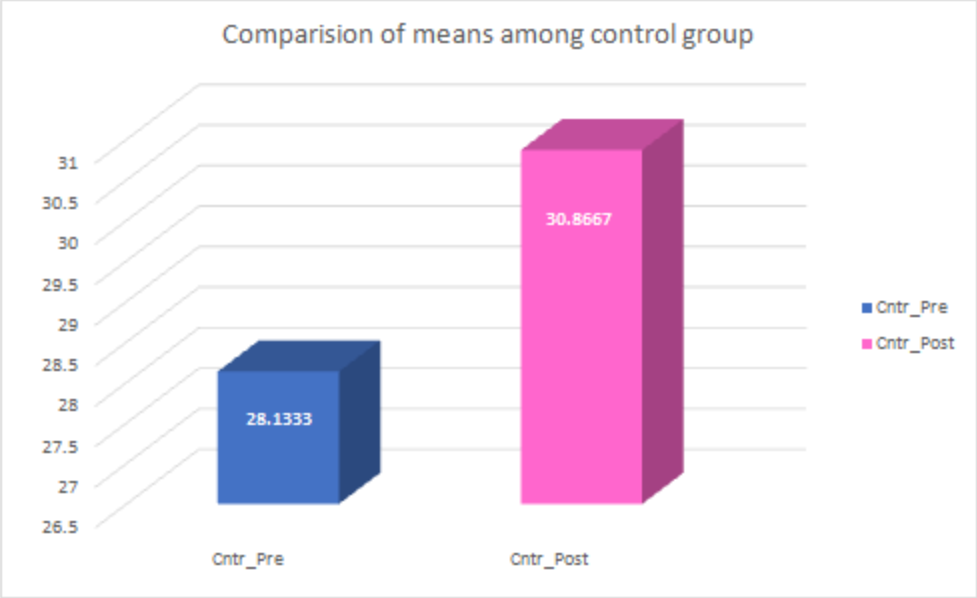
DATA ANALYSIS AND RESULTS

Table 1: Statistical analysis of pre- test and post- test in control group

	Mean	N	Z value	p value
Cntr_Pre	28.1333	15	-3.449	0.001*
Cntr_Post	30.8667	15		

***Significant at 5% alpha level**

Since the p value of 0.001 is lesser than 0.05, alternate hypothesis is accepted. Hence, there is statistically significant difference between pre- test and post test scores in the Control Group of the Berg Balance scale. This suggests that the intervention received by the control group had significant improvement.



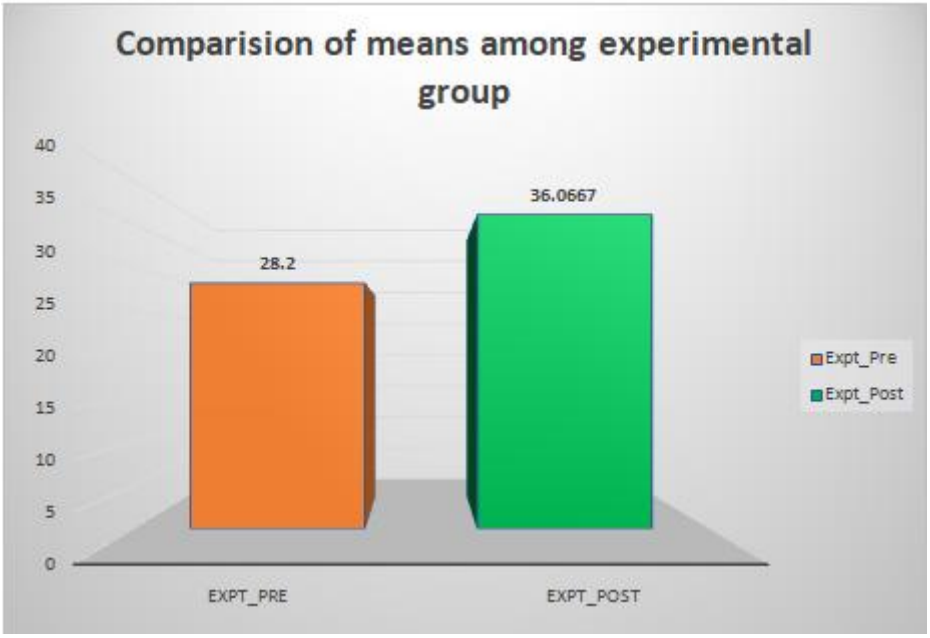
Graph 1: Comparison of pre-test and post-test means of control group

Table 4.2: Statistical analysis of pre- test and post- test in experimental group

	Mean	N	Z value	p value
Expt_Pre	28.2	15	-3.425	0.001*
Expt_Post	36.0667	15		

*** Significant at 5% alpha level**

In the Experimental group, since the p value of 0.001 is less than 0.05, alternate hypothesis is accepted. Hence, there is statistically significant difference in Experimental Group between pre-test and post test scores of Berg balance scale. This suggests that the intervention received by the experimental group had significant improvement.



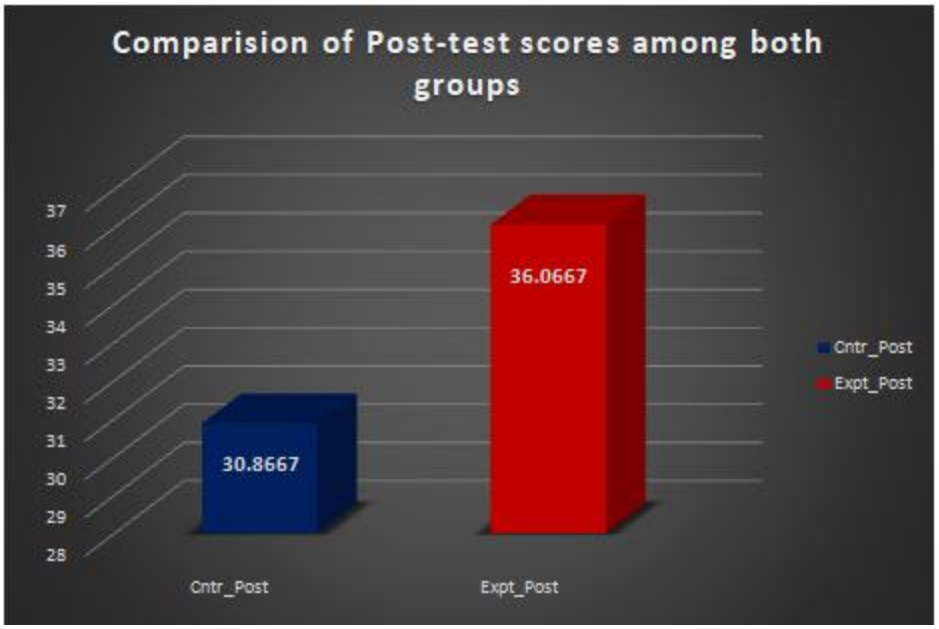
Graph 2: Comparison of pre-test and post-test means of experimental group

Table 3: Statistical analysis between the post- test scores of the control and experimental group

	Mean	**N**	**Z value**	**p value**
Cntr_Post	30.8667	15	2.03243	0.04236*
Expt_Post	36.0667	15		

***Significant at 5% alpha level**

Since the p value of 0.04236 is lesser than 0.05, alternate hypothesis is accepted. Hence, there is statistically significant difference in post test scores between Experimental and Control Group of the Berg Balance scale. This suggests that the intervention received by the experimental group had more improvement when compared to the control group.



Graph 3: Comparison of Post-test scores among control and experimental groups

DISCUSSION

The aim of the study was to find out the effect of Dual task training on improving balance among geriatric population. The samples were collected from The Divine old age home at Maduravoyal .A total of 30 older adults were selected and were divided equally into two groups as control group and experimental group. The experimental group consists of 15 samples and the control group consists of 15 samples .The level of balance in elderly was measured using Bergs Balance Scale in both the groups. The experimental group underwent Dual task training for 3 months and the control group underwent conventional occupational therapy. The post test was done and results were analysed. According to Table 1 and graph 1In **control group**, the conventional occupational therapy program included other balance interventions like weight shifting, balance board activities for control group has statistically significant difference pre- and post-test score of Berg's Balance Scale. Table 2 and graph 2 In **experimental group**, the Dual Task Training as intervention between pretest and posttest scores of Berg's Balance Scale, there is statistically significant difference between pretest and post test scores in experimental group of the Bergs Balance scale. In the experimental group most of the patients shows improved balance. Table 3 and figure 3 showed the statistical analysis of post-test of Bergs Balance Scale score in control and experimental group hence, there is statistically significant difference in post-test score between experimental group and control group of Bergs Balance Scale after the application of Dual Task Training intervention.

CONCLUSION

The study investigated on the effect of Dual task training to improve balance among geriatric population.

The study was conducted over a period of three(3) months .Totally thirty (30) older adults were selected for this study.15 sample were in control group and 15 samples were in experimental group .pre and post test was conducted in both groups by using Bergs Balance Scale. Experimental group underwent Dual task training, whereas control group received only conventional occupational therapy.

The results shows that they were significant improvement in the experimental group more than the control group after training with Dual tasks.

This study proves that effectiveness of Dual task training to improve balance among geriatric population.

Limitations:

- Study was done on a small sample size.
- Study was conducted for a shorter duration of time.

Recommendations:

- Study can be done with a larger sample sized.
- Study can be done for different age groups with balance impairment.
- Study can be done for longer duration of time.
- This study can also be done for conditions such stroke, Parkinson's disease, Multiple scleroses ect.
- This study can also be done on various components such as attention, concentration, problem solving by using one or both cognitive tasks.

Source of finding: Self
Conflicting interest: None
Ethics clearance: Approved from Institution Scientific Review Board (ISRB) was obtained prior to the study.

REFERENCES

[1]. Hofheinz, M., Mibs, M., &Elsner, B. (2016). Dual task training for improving balance and gait in people with stroke. The Cochrane Database of Systematic Reviews, 2016(10).
[2]. Dorfman, M., Herman, T., Brozgol, M., Shema, S., Weiss, A., Hausdorff, J. M., &Mirelman, A. (2014). Dual-task training on a treadmill to improve gait and cognitive function in elderly idiopathic fallers. Journal of Neurologic Physical Therapy, 38(4), 246-253.
[3]. JuHyung Park et al ,(2019**)**Dual Task Training Effects on Upper Extremity Functions and Performance of Daily Activities of Chronic Stroke Patients Osong Public Health and Research Perspectives
[4]. Rai, S., &Ganvir, S. Dual Task Training in Patients with Stroke for Improving Balance and Gait: A Systematic Review.

[5]. Subha. SP, Mahesh. R, Ashwathy. A. et al. Effect of single task training verses motor dual task training on functionalbalance in post stroke patients. International Journal of Science & Healthcare Research. 2019; 4(3): 139-143.
[6]. Değer, T. B., Saraç, Z. F., Savaş, E. S., &Akçiçek, S. F. (2019). The relationship of balance disorders with falling, the effect of health problems, and social life on postural balance in the elderly living in a district in Turkey. Geriatrics, 4(2), 37.
[7]. An, H. J., Kim, J. I., Kim, Y. R., Lee, K. B., Kim, D. J., Yoo, K. T., & Choi, J. H. (2014). The effect of various dual task training methods with gait on the balance and gait of patients with chronic stroke. Journal of physical therapy science, 26(8), 1287-1291.
[8]. Sahu, S., & Srivastava, A. (2016). Effect of dual task training program on quality of life in patients with Parkinson's disease. Indian J OccupTher, 48(2), 37-41.
[9]. .Osoba, M. Y., Rao, A. K., Agrawal, S. K., &Lalwani, A. K. (2019). Balance and gait in the elderly: A contemporary review. Laryngoscope investigative otolaryngology, 4(1), 143-153
[10]. Leland, N. E., Elliott, S. J., O'Malley, L., & Murphy, S. L. (2012). Occupational therapy in fall prevention: Current evidence and future directions. The American Journal of Occupational Therapy, 66(2), 149-160.
[11]. Peterson, E. W., Finlayson, M., Elliott, S. J., Painter, J. A., & Clemson, L. (2012). Unprecedented opportunities in fall prevention for occupational therapy practitioners. The American Journal of Occupational Therapy, 66(2), 127-130.
[12]. Jardim, N. Y. V., Bento-Torres, N. V. O., Costa, V. O., Carvalho, J. P. R., Pontes, H. T. S., Tomás, A. M., ... &Diniz, C. W. P. (2021). Dual-task exercise to improve cognition and functional capacity of healthy older adults. Frontiers in Aging Neuroscience, 13, 33.
[13]. Silsupadol, P., Shumway-Cook, A., Lugade, V., van Donkelaar, P., Chou, L. S., Mayr, U., &Woollacott, M. H. (2009). Effects of single-task versus dual-task training on balance performance in older adults: a double-blind, randomized controlled trial. Archives of physical medicine and rehabilitation, 90(3), 381-387.
[14]. Sison, J. (2009). Effects of Single-Task Versus Dual-Task Training on Balance Performance in Older Adults: A Double-Blind, Randomi... Arch Phys Med Rehabil, 90(3), 381-387.
[15]. Shin SS, an DH. (2014) The effect of motor dual-task balance training on balance and gait of elderly women. Journal of Physical Therapy Science 2014; 26:359-61