



Effect Of Dual-Task Training To Improve Balance And Adl Performance In Older Adults In Indian Population

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Abstract

Aim-To identify the effect of dual-task training to improve balance and ADL performance among older adults in Indian population.

Objective-To evaluate the effect of dual-task training to improve balance and ADL performance among older adults in Indian population.

Background- Elderly people are vulnerable to functional impairments. Common activities like rising from the chair, reaching top shelves, activities requiring postural responses, functional activities like walking, climbing stairs becomes challenging and risky.

Methodology: -The study took place at old age home, Noida. The consent form has been given at the beginning of the study each subject explained about the protocol. Pre assessment has been done at the beginning of the study and post assessment has been done after the 4 weeks of the study along with that follow up assessment has been done after 1 week. Each patient received sessions for 1 hour for 5 days in a week for 4 weeks.

Result: -The study's findings shows a significant improvement in balance and Activities of Daily Living (ADL) performance among older adults following the dual task training intervention. **Conclusion** In conclusion, the findings from the t-test assessing the impact of dual-task training on balance and Activities of Daily Living (ADL) performance among older adults present compelling evidence of its effectiveness. The significant improvements observed in both the Performance-Oriented Mobility Assessment (POMA) and KATZ results underscore the positive impact of the intervention on mobility, balance, and independence in daily activities for older adults in India.

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Keywords Balance, Performance, POMA, KATZ ADL, Dual Task, Conventional Occupational Therapy

Introduction

Ageing progressively declines movements and functions, thereby impacting muscle strength, endurance and power. By 2025, the geriatric population is expected to be 840 million in developing countries. The distribution of elderly aged 60 and above is projected to increase from 7.5% in 2010 to 11.1% in 2025. The elderly population in India is expected to reach 158.7 million in 2025 eventually increasing the burden on the resources of the country.² Elderly people are vulnerable to functional impairments. Common activities like rising from the chair, reaching top shelves, activities requiring postural responses, functional activities like walking, climbing stairs becomes challenging and risky. The impaired mobility and muscle strength gradually lead to loss of balance, body instability and increases the risk of falls. The reductions in the important physical components due to ageing have to be identified at the earliest to prevent & control essential physical losses. The uses of various physical exercises in enhancing functional activity in older adults have been the focus of recent research. The exercise protocol requires the inclusion of the best possible combination of training parameters to improve musculoskeletal, neurological & cardiovascular adaptations which can help cope with the functional activity. Age-related cognitive deterioration is also a factor. Since a diminished capacity to maintain balance while completing cognitive activities is connected with higher risk of falling, a number of research have tried to discover the best effective strategy to improve dual-task balance performance in older persons. As of now, it is clear that dual-task training outperforms single-task training in terms of enhancing dual-task balance and gait performance.

Methodology

The methodology for investigating the effectiveness of dual-task training in improving balance and activities of daily living (ADL) performance among older adults in the Indian population would typically involve the following components: **Study Design:** A randomized controlled trial (RCT) design would be appropriate to evaluate the efficacy of dual-task training. Participants would be randomly assigned to either the intervention group receiving dual-task training or a control group receiving standard care or alternative interventions. **Participant Recruitment:** Older adults aged 60 years and above, representing diverse socio-economic backgrounds and health statuses, would be recruited from community centers, senior living facilities, and healthcare clinics in urban and rural areas of India. **Informed consent** would be obtained from all participants prior to enrollment. **Baseline Assessments:** Baseline assessments would be conducted to evaluate participants' baseline levels of balance and ADL performance using standardized measures such as the Berg Balance Scale, Timed Up and Go test, Katz Index of Independence in Activities of Daily Living, and Lawton Instrumental Activities of Daily Living Scale.

MATERIALS AND TOOLS REQUIRED:

1. Yoga Mat
2. Chair
3. Bench
4. Notebook and pen

STUDY DURATION: 4 week-5 days/week

INTERVENTION

The intervention group would participate in a structured dual-task training program designed to improve both cognitive and motor functions simultaneously. The training program may include exercises such as walking while performing cognitive tasks (e.g., counting backward), balance exercises combined with cognitive challenges (e.g., solving puzzles), and functional activities incorporating dual-task components (e.g., reaching while reciting words). The variables in a study investigating the effectiveness of dual-task training in improving balance and activities of daily living (ADL) performance among older adults in the Indian population can be categorized into independent, dependent, and potentially moderator variables. Here's how they might be defined:

1. Independent Variable: - Dual-Task Training
2. Dependent Variables: - Balance

DATA ANALYSIS:

Data analysis was done to compare pre post characteristics of both experimental and control group. To test the hypothesis, the statistical analysis was done by using paired t-test in both experimental and control group. Pearson correlation has been used to analyses the correlation of both pre- test and post- test groups of both control and experimental group

Comparison of Control and Experimental Group:

Stats	Control Group				Experimental Group			
	POMA		KATZ		POMA		KATZ	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Mean	20.1	23.45	2.75	3.8	18.95	23	2.15	4.15
Standard Error	0.934	0.875	0.289	0.329	0.749	0.715	0.221	0.264
Standard Deviation	4.179	3.913	1.293	1.473	3.348	3.195	0.988	1.182
Sample Variance	17.463	15.313	1.671	2.168	11.208	10.211	0.976	1.397

Table 5.0 Descriptive Stats of Pre-Post Control and Experimental Group

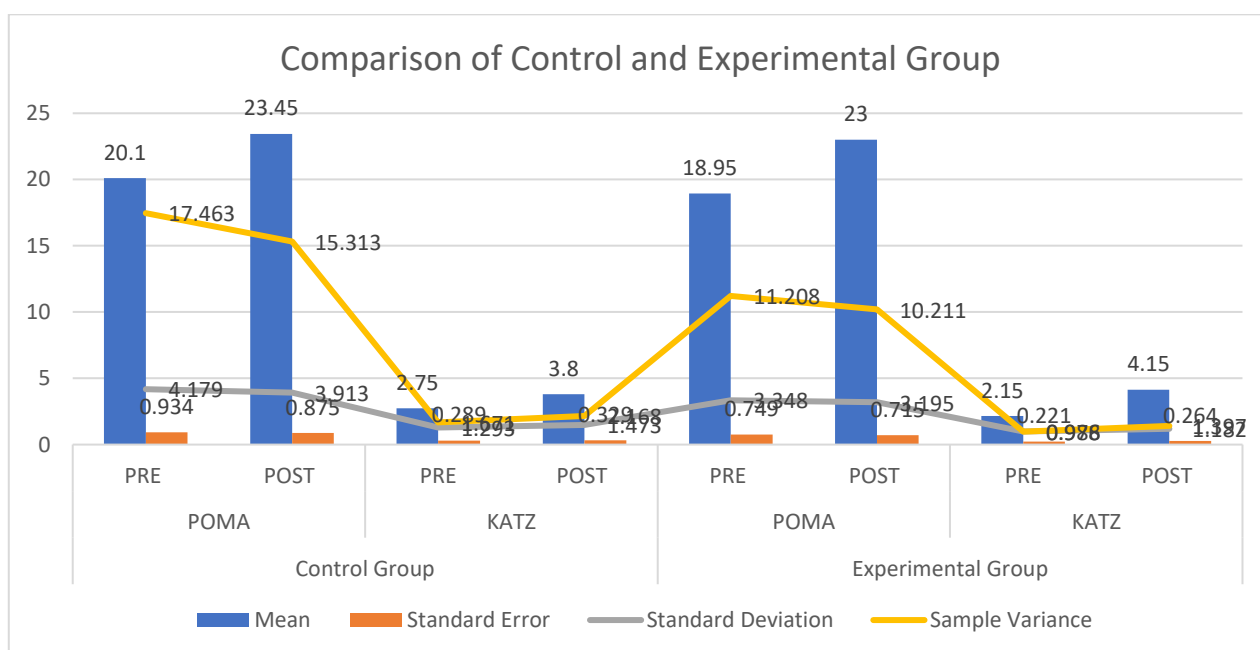


Figure 5.0 Descriptive Stats of Pre-Post Control and Experimental Group

The comparative analysis presented in Table 5.0 and Figure 5.0 delineates the efficacy of pre-post POMA and KATZ assessments across both control and experimental groups. Metrics such as mean values, standard errors, standard deviations, and sample variances were utilized to gauge the effectiveness of interventions. Results consistently indicate that the experimental cohort demonstrated superior enhancement in both balance and Activities of Daily Living (ADL) through the implementation of POMA and KATZ assessments. The implementation of dual-task training yielded significant improvements in these areas among older adults in the experimental group, surpassing the gains observed in the control group. Although both groups exhibited progress in balance and ADL, the experimental intervention emerged as notably more impactful and efficient in fostering these advancements.

Result

The result of the assessment are as follow, For the POMA assessment, the mean pre-POMA score was 20.1, increasing to 23.45 post-POMA. This improvement signifies enhanced mobility and balance among the older participants. The Pearson correlation coefficient of 0.9916 indicates a strong positive relationship between POMA scores and balance enhancement. With a p-value of $3.65E-16$ (<0.05), the null hypothesis is rejected in favor of the alternative hypothesis, suggesting a significant effect of dual-task training on participants. Similarly, the KATZ results show a notable improvement in independence among older adults. The mean pre-KATZ independence index was 2.75, rising to 3.8 post-KATZ. This enhancement signifies increased independence in ADL. The Pearson correlation coefficient of 0.9677 demonstrates a positive correlation between KATZ scores and independence levels. With a p-value of $2.91E-10$ (<0.05), the alternative hypothesis is accepted, indicates improvement balance and ADL performance in older adults.

Discussion

The aim of the study is to find out the effect of dual-task training to improve balance and ADL performance among older adults in Indian population. The researcher conducted the study at Noida Old Age Home, Noida Gautam Budha Nagar district. The services are provided in this old age home includes daily care, medical and daily activities of old age persons of 70 older adults

Participants were 40 male and female older adults having issues with balance and performance in activities of daily life who met the selection criteria were then allocated into 2 groups such as Experimental group and Control group. The researcher obtained informed consent from the patients and care givers for the intervention and to use their data for assessment and to measure the outcome of the intervention. The results of a t-test assessing the impact of dual-task training on enhancing balance and Activities of Daily Living (ADL) performance among older adults, as measured by pre-post Performance-Oriented Mobility Assessment (POMA) and KATZ results are For the POMA assessment, the mean pre-POMA score was 20.1, increasing to 23.45 post-POMA. This improvement signifies enhanced mobility and balance among the older adults' participants. The Pearson correlation coefficient of 0.9916 indicates a strong positive relationship between POMA scores and balance enhancement. With a p-value of $3.65E-16$ (<0.05), the null hypothesis is rejected in favor of the alternative hypothesis, suggesting a significant effect of dual-task training on improving balance and ADL performance in the Indian elderly population.

Similarly, the KATZ results show a notable improvement in independence among older adults. The mean pre-KATZ independence index was 2.75, rising to 3.8 post-KATZ. This enhancement signifies increased independence in ADL. The Pearson correlation coefficient of 0.9677 demonstrates a positive correlation between KATZ scores and independence levels. With a p-value of $2.91E-10$ (<0.05), the alternative hypothesis is accepted, indicating the effectiveness of dual-task training in improving balance and ADL performance among older adults in India.

These findings highlight significant improvements in mobility, balance, and ADL performance among older adults following dual-task training. The positive correlation between assessment scores and improvements underscores the efficacy of the intervention in enhancing overall quality of life for older adults, reducing the risk of falls and promoting independence in daily activities. The analysis of pre- and post-intervention Performance-Oriented Mobility Assessment (POMA) and Katz Activities of Daily Living (ADL) scores across control and experimental groups reveals notable differences. Statistical measures including mean, standard error, standard deviation, and sample variance were computed for both groups.

Results demonstrate that the experimental group exhibited greater effectiveness in enhancing both balance and ADL compared to the control group. Dual-task training interventions significantly improved balance and ADL in older adults within the experimental group, surpassing improvements observed in the control group. Although both groups demonstrated enhancements in balance and ADL, the experimental group's interventions proved more efficacious and efficient in achieving these outcomes.

Conclusion

In conclusion, the findings from the t-test assessing the impact of dual-task training on balance and Activities of Daily Living (ADL) performance among older adults present compelling evidence of its effectiveness. The significant improvements observed in both the Performance-Oriented Mobility Assessment (POMA) and KATZ results underscore the positive impact of the intervention on mobility, balance, and independence in daily activities for older adults in India.

From this study, it is concluded that there is a significant improvement in balance and performance among older adults. The results of the study demonstrated that dual-task training is efficacious for balance and performance among older adults in comparison to Conventional Occupational Therapy.

Limitations

- Sample size is limited for each group.
- Study was done for confined age group.
- Sample are collected from the single center affect the generalization of treatment.
- No follow up was done to see the maintenance effect of dual-task Training.

Future recommendation of the study

- Long term follow-up study can be conducted to understand the sustained effect of Dual Task Training.
- Large sample size may be used to find the effect of Dual Task Training.
- Training was given only to subacute patients, future studies on older adult population can conducted.

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