

An Experimental Study on Task-Oriented Motor Practice on Aerobic Capacity, Risk of Fall and Quality of Life in Elderly Population

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ABSTRACT

Background of the study: Aging is defined as “a persistent decline in the age-specific fitness components of an organism due to internal physiological degeneration.” proper balance is needed during the most activities of daily life. A reduction in balancing ability is one of the factors that adversely affect the ADL and QOL of elderly population. The balance control is a complex process which requires the coordination of the sensory, musculoskeletal and nervous systems. Furthermore, producing corrective movement for balance demands adequate musculoskeletal functions as well. Studies examining age-related changes of balance control showed that sway during quiet stance begins to increase approximately at the age of fifty (2). With the increase of ageing population, improving of the elderly adults’ balance control is becoming more and more important.

Subjects and Methods: 30 elderly persons were divided into two groups: intervention group (n=15) and control group (n=15).

Methodology: Task-Oriented Motor Practice, 8 weeks; 3 sessions per week, 1 hours/session once a day

Results: The task-oriented activities promoted hand function (coordination).

Conclusion: Initially task-oriented motor practice was used only in neurological rehabilitation. In the recent years this therapeutic approach was applied among elderly population as well. Our results showed that task-oriented motor practice might be an acceptable, safe and effective type of exercise program for even community-living elderly adults to maintain and improve their functional abilities.

Keywords: 6 Minutes’ Walk Test, Time Up and Go Test, SF 12, task oriented training.

1. INTRODUCTION

Aging is defined as “a persistent decline in the age-specific fitness components of an organism due to internal physiological degeneration.” proper balance is needed during the most activities of daily life. A reduction in balancing ability is one of the factors that adversely affect the ADL and QOL of elderly population. The balance control is a complex process which requires the coordination of the sensory, musculoskeletal and nervous systems. Furthermore, producing corrective movement for balance demands adequate musculoskeletal functions as well. Studies examining age-related changes of balance control showed that sway during quiet stance begins to increase approximately at the age of fifty (2). With the increase of ageing population, improving of the elderly adults’ balance control is becoming more and more important.

A previous study reported that task-oriented training significantly improved the balance and movement ability of elderly population. For elder individuals, the desire and motivation to participate in treatment programs are closely related to the restoration of exercise ability. Self-efficacy is an important precursor of health behaviour. Self-efficacy refers to a person’s belief in their ability to overcome a crisis in life, and to perform a behaviour or activity successfully.

Task-oriented programs can be designed to enable people to accomplish specific tasks which can improve the psychological and physical well-being of older individual. The task-oriented approach used in the present study includes problem solving and functional tasks. Functional training consists of tasks which are important, meaningful, and useful for people simulate

their everyday activities. A study showed that practicing of meaningful tasks produced increased motor cortical representations than repetition of exercises without meaning. Since then, several clinical studies have proved that this therapeutic approach results in greater improvement which lasted longer in balance, aerobic capacity than usual exercises.

So far very few studies have evaluated the effects of Task-oriented programs among ageing population. To our knowledge, there is no Task-oriented motor programs study conducted among community-living elderly adults. The program consisting of exercises simulating everyday activities which required rotating head and trunk, weight transfer over different base of support. The exercises were accompanied by instructions reflecting selfcare, household or leisure-time activities which were meaningful and familiar to elderly people. The assumption underlying our exercise program was that practice and repetition of challenging task-oriented exercises accompanied by instructions recalling known situations might help imagine and perform the movement correctly, hence might help the process of motor learning

SUBJECT AND METHODS:

STUDY DESIGN: Prospective RCT

STUDY TYPE: Experimental study

STUDY SETTING: Guwahati Old Age Home

PARTICIPANTS: Elderly Population

SAMPLING: Purposive Sampling

INCLUSION CRITERIA:

- Elderly population, living in community
- Able to move independently.
- Both gender male and female
- Age group of 50 to 75 years.

EXCLUSION CRITERIA:

- Individual with progressive neurological disorder.
- cardio vascular disorder like angina, uncontrolled hypertension
- cognitive impairment
- Significant visual or hearing impairment

SAMPLE SIZE: N-30 patients

SAMPLE DURATON: 6 months

VARIABLES: INDEPENDENT: Task-Oriented Motor Practice

DEPENDENT: Aerobic capacity, risk of fall Quality of life

OUTCOME MEASURES:

Timed Up and Go (TUG) test:

The functional mobility was assessed with the Timed Up and Go (TUG) test (12). In TUG test, each participant was asked to stand up from a chair (approximate seat height of 46 cm), walk at a comfortable but secure speed to a cone on the floor 3 metres away and return to sit down on the chair. The time required was recorded. The digital stop-watch was stopped when he/she reached the sitting position with back against the backrest. The subject was allowed to wear their regular footwear and use the arms of the chair to get up. No physical assistance was given. The subject performed a trial once before testing. We calculated the average time of two consecutive performances and the participant was allowed to rest for 30 seconds between the trials, if needed. The TUG test has high interrater (Correlation Coefficients = 0.99) and intrarater (Correlation Coefficients = 0.99) reliability (12).

6-minute walk test (6-MWT):

The 6-minute walk test was done to assess the walking endurance of the subjects. Subjects walked over a 40- metre walkway of the remedial therapeutic gymnasium for six minutes. The total distance covered during the 6 minutes was measured. Prior to the test, subjects were told that they could rest but that was allowed only at their request and it could be either sitting or standing and they were again told they could walk with or without their walking aids (Lord and Rochester, 2005).

EQ-5D (EuroQol):

The health-related quality of life was assessed using the EQ-5D (EuroQol) self-report questionnaire with which the respondent could classify his/her health according to five dimensions (mobility, self-care, usual activity, pain/discomfort, anxiety/depression) and rate his/her health on a visual Analogue Scale. The information derived from the EQ-5D dimensions was converted into a single summary index (EQ-5D index). The EQ-5D index ranged from 0 to 1, with higher value reflecting better self-experienced health-related quality of life.

INTERVENTION

TASK-ORIENTED MOTOR PRACTICE

Warm up: AROM exercises, flexibility and stretching exercises, lastly ended with breathing exercise program. [5-10 min]

Exercises: stairs walking and cycling exercises. sit-to-stand, sit down, turning, squatting, reaching to different directions, stepping up and down, stepping to different directions with weight transfer, standing and walking on narrow base of support, walking on uneven and soft surfaces, walking to different directions, walking avoiding obstacles, walking with changing directions, wearing clothes, Catching things etc.

Duration – 8 weeks; 3 sessions per week, 1 hours/session once a day.

TABLE 1: Comparison of pretest and post test scores of different variables by paired t test

Variables		Mean $\pm$ Std. Deviation	p-value
TUG test (seconds)	pre	9.88 ($\pm$ 1.46)	<0.0001
	post	8.75 ($\pm$ 1.23)	
6-MWT (m)	pre	249.5 $\pm$ 10.7	<0.0001
	post	262.3 $\pm$ 17.9	
(EuroQol)	pre	0.76 ($\pm$ 0.2)	<0.0001
	post	0.87 ($\pm$ 0.16)	

The above table shows that the Pre and post intervention values (Mean $\pm$ Std. Deviation) of TUG test, 6-MWT (m) and (EuroQol). There is significant difference between Pre and post intervention score and the p-value ($p < 0.01$) considered as statistically significant. So, there is significant effect of Task-Oriented Motor Practice on aerobic capacity, risk of fall and quality of life in Elderly Population.

2. DISCUSSION

This study was designed to evaluate the effects of a 8-week Task-Oriented Motor Practice on aerobic capacity, risk of fall and quality of life among elderly population. We found that the post intervention values was significantly better in TUG, 6 min walk test and health-related quality of life after the training period. Previous studies demonstrate the beneficial effects of functional training among people suffering from neurological diseases.

Studies evaluating the effects of Task-Oriented Motor Practice among elderly population showed that balance and functional mobility improved following both 8-week task-oriented Motor Practice programs. To our knowledge, our study is the first task-oriented Motor Practice study which focused on community-living elderly population. Similarly, to studies focusing on institutionalized elderly adults, we also observed improvement in static balance, dynamic balance and functional mobility. Our findings that aerobic endurance and quality of life improve are also in accordance with results from past geriatric trials.

Several observational studies indicate that leisure time physical activity is associated with health-related quality of life. In our trial a significant improvement was detected in the TUG, 6 min walk test and (EuroQol) scores. Better quality of life could be explained by a significant improvement in functional mobility. Our result that exercise program improves quality of life even among elderly people is consistent with previous studies in this area.

3. CONCLUSION

Initially task-oriented motor practice was used only in neurological rehabilitation. In the recent years this therapeutic approach was applied among elderly population as well. Our results showed that task-oriented motor practice might be an acceptable, safe and effective type of exercise program for even community-living elderly adults to maintain and improve their functional abilities.

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CONFLICT OF INTEREST:

The authors have no conflict of interest to report

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