



ORIGINAL RESEARCH PAPER

Community Physiotherapy

EFFECT OF OTAGO EXERCISE PROGRAMME(OEP) ON BALANCE AND FUNCTIONAL MOBILITY AMONG ELDER PEOPLE IN RURAL POPULATION

KEY WORDS: Balance, Functional mobility, Elderly population, Otago exercise programme.

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ABSTRACT

Background: Elderly people have common geriatric problems like impaired mobility and impaired balance which leads to falls and their consequences are a major health issue. There is a need of effective fall prevention exercises programs for elderly people to improve balance and functional activities. **Purpose:** This study aimed to find out the effectiveness of Otago exercise programme to improve balance and functional mobility in elder population. **Methods:** This study included 60 elderly people with the age between 60-75. The total population were divided into two groups, Group A - Experimental group and Group B - Control group. Each group consists of 20 people. The experimental group received Otago balance exercise programme (OEP) and the control group were allowed to continue their routine activities of daily living. Berg Balance Scale (BBS) and Timed Up and Go Test (TUG) were used as an outcome measures to evaluate the balance and functional activities. Pre and post assessments was taken before and after the intervention and analysed with appropriate statistical tools. **Results:** The mean values of TUG and BBS were improved in the experimental group than the control group and it was statistically significant with the p value 0.001 (<0.05). This result infers that there is significant difference exists between the experimental group and control group which implies that TUG score and BBS scores were improved in experimental group than the control group which is statistically significant. **Conclusion:** The observed results show that the functional capacity and balance were improved in the experimental group exposed to OEP home program. It was concluded that Otago exercise program is effective in improving functional capacity and balance in elderly population.

INTRODUCTION

According to WHO the size of the elderly population has been increasing rapidly in India due to various social economic and health issues. The common problems that exist in the geriatric populations are impaired mobility, impaired cognition, urinary incontinence, and frequent falls¹. It was also observed that among the geriatric population elderly people above 60 years of age group about of than other age groups. Kinsella &Phillips et al (2005) addressed that one-third of the elderly population between the age group of 60 to 70 years are exposed to falls and this population increases globally which required huge demand for geriatric health services and fall prevention strategies². Impaired balance and mobility lead to frequent falls among older adults, which is considered a major health issue nowadays³. WHO declared that the rate of falls is increasing by 32- 42% in the age group above 70 years and 28 -35 % in the age group of 65 and above. The frequency of falls increases with age and frailty level. Literature also revealed that 30% of community dwellers above 60 years are exposed to one or more falls every year.

Poor balance and functional activity play a significant risk factor for falls and minimize participation in the community. Thus the fear of falling leads to both functional decline and poor QOL. Masud and Morris (2001)⁴ identified there are 400 risk factors for falls among these lower limb weakness and impaired balance is the two which could be modifiable, activity limitation and also one of the risk factors for fall, muscle atrophy, and poor balance⁵⁻⁷. There are many exercise interventions available to improve balance and functional activities for elderly people balance training, strengthening programme and endurance training which have proved their effectiveness in improving physical fitness and reducing fall in the elderly community⁸⁻¹⁴.

Otago intervention includes almost all the components of improving balance, strength and functional capacity of elderly subjects¹⁵⁻¹⁷. The Otago exercise program (OEP) is the home based mobility training program designed to prevent falls in elder population living in the community. It is a set of exercises which is simple and can be performed at home by the elderly community^{18,19}. The OEP require relatively low supervision and material costs²⁰. Community studies are

limited to elderly people improving balance and functional activities. Only few studies done to know the impact of Otago interventions in the elderly population^{21,22}. Less number of studies were done in India (especially in rural population) using this home based exercise program. This study aimed to find out whether Otago exercise program (OEP) is effective in improving balance and functional activities in community dwelling elder people in rural area. The purpose of this study was to determine whether there were measureable differences in balance and functional activity in a group of community dwelling elderly people participating in the Otago exercise program.



Fig.1 Otago Exercise Program (OEP)

MATERIAL AND METHODS:

Experimental study was carried out in Anbagam old age home (Community setting) in Chidambaram. The purpose of the study was clearly explained and informed consent was obtained from the elder population. There are 60 elder people with the age between 60-75 years were included in the study based on the inclusion and exclusion criteria. Inclusion criteria: Aged over 60-75 years, both sex, subject who are all willing to participate and exclusion criteria: History of acute cardiac and respiratory conditions, History of recent neurological and orthopaedic surgeries, history of recent fractures, acute illness or injury, people with poor cognition, vision and hearing impairment. The total population were divided in to two groups, Group A - Experimental group and Group B - Control group. Each group consists of 30 people. The Experimental group received Otago balance exercise programme (OEP), which is a home based exercise program. They were asked to perform the OEP for 1 hour/day, 3 days per week for 6 weeks. The people in the control group were allowed to continue their routine activities of daily living. Berg Balance Scale (BBS) and Timed Up and Go Test (TUG) were used as an outcome measures to evaluate the balance and functional activities. Pre and post assessments were taken before the intervention and after 6 weeks. The data were recorded and analyzed with the appropriate statistical tool.

STATISTICAL ANALYSIS AND RESULTS:

In this study the data was analysed and compared between and within the groups. Statistical analysis was done by SPSS version 18 with the level of significance set at 0.05. Student's t-test has been applied to find out the difference that exists between the groups and within the groups. The basic characteristics of the study population were analysed and displayed in **table 1**. The mean age of the participants was 71.15±4.08 year and gender was equally distributed in both groups. It was observed that the female participants were 55% and male were 45%. It was also observed from **table -2** that, the mean TUG score was 21.02 ± 3.81 at baseline in group 'A' and it was significantly reduced to 17.09 ± 3.85 following the intervention, with the p value 0.001 which is statistically significant. The mean score TUG at baseline in Group 'B' was 18.07 and it was increased to 18.15 second at the end of the study period, the difference was statistically insignificant, with the p value 0.700.

The results inferred that there is significant improvement of functional mobility observed in experimental group and there is no significant improvement in the control group regarding functional ability. **Table 3** displayed that the mean BBS score in Group 'A' was 32.60 ± 11.89 before intervention and it was improved as 36.20 ± 11.20 after the intervention. The improvement was statistically significant with the p value 0.001 (<0.05). The mean BBS was 34.90 ± 6.74 at the baseline in Group 'B' and it was improved to 35.25 ± 6.16 after the intervention. The improvement was statistically insignificant with the p value 0.320 (>0.05).

The result infers that there is significant improvement of balance observed in the experimental group and no significant improvement in the control group. It is inferred from table-4 that, the mean values of TUG and BBS were improved in the experimental group than the control group and it was statistically significant with the p value 0.001 (<0.05). It was also observed that the mean difference of BBS score was higher in the experimental group than the control group which is also statistically significant (p<0.05) (fig-8).

This result infers that there is significant difference exists between the experimental group and control group which implies that TUG score and BBS scores were improved in experimental group than the control group which is statistically significant. The observed results show that the functional capacity and balance were improved in the experimental group than the control group.

Table.1 Age Distribution Of The Study Participants

Age (in years)	Experimental group (A)		Control group (B)	
	Mean	S.D	Mean	S.D
	71.15	4.08	66.55	5.29
Age distribution	N	%	N	%
60-65	1	5	11	55
66-70	7	35	4	20
71-75	12	60	5	25
Total	20	100	20	100

Table.2 Comparison Of Timed Up And Go Test (TUG) Within Groups

	Pre-intervention		Post-intervention		t-value	p-value
	Mean	S.D	Mean	S.D		
Experimental group (Group A)	21.02	3.81	17.09	3.85	7.88	0.001
Control group (Group B)	18.07	4.22	18.15	4.17	0.39	0.700

Table.3 Comparison Of Berg Balance Scale (BBS) – Within Group Analysis

	Pre-intervention		Post-intervention		t-value	p-value
	Mean	S.D	Mean	S.D		
Experimental group (Group A)	32.60	11.89	36.20	11.20	7.53	0.001
Control group (Group B)	34.90	6.74	35.25	6.16	1.02	0.320

Table. 4 Comparison Of Timed Up And Go Test (TUG) And Berg Balance Scale (BBS) Between The Groups

Study variables	Experimental group (Group A)		Control group (Group B)		t-value	p-value
	Mean	S.D	Mean	S.D		
TUG (seconds)	17.09	3.85	18.15	4.17	7.43	0.001
BBS	36.20	11.20	35.25	6.16	5.53	0.001

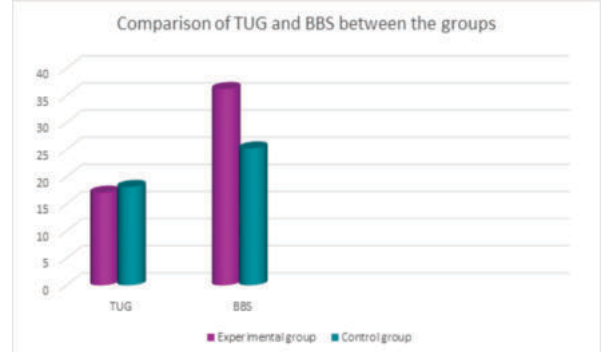


Figure.1 Comparison Of TUG And BBS Between The Groups

DISCUSSION

The purpose of this study was to determine whether there were measurable differences in balance and functional activity in a group of community dwelling elderly people participating in the Otago exercise program in Chidambaram. In this study, 40 elderly people were included and the study population divided into control group and experimental group. Each group consists of 20 participants, Experimental group participants were exposed to OEP with the protocol of 1 hour of exercise, 3 days/week for 6 weeks and control group participants were allowed to continue their regular activities. The basic characteristics of study population was analyzed with the descriptive statistics; the observed result shows that the mean age of the observed study participants was 71%, whereas in the experimental group 60% of the participants observed in the age category of 71-75 years and 55% of the participants observed in the age of 60-65 years in the control group. The variations in the

distribution of age is due to the convenient sampling method was chosen in this study to separate the groups. The elderly people who are all willing to explore the new home based exercise program were allotted to the experimental group. In this study, the gender was equally distributed in both groups, there are 55% of female participants and 45% of male participants were observed.

TUG test was used to evaluate the functional mobility of the study population²³. Hughes et al 1998 reported that the TUG is the useful measure to quantify the functional mobility in elderly population²⁴. Steffen et al 2002 reported that TUG test is a useful measure for identifying community dwelling adults who are at risk of falling²⁵. The balance component of study population evaluated by using BBS reported that BBS is the performance-based measure designed to monitor the performance during balance activity and to predict community dwelling older adults²⁶. The distribution of TUG score and BBS scores were analyzed in both groups which implies that most of the population completed their task in less than 21 seconds, few members had completed the task in less than 21 seconds regarding TUG test. This result implies that the observed study population in both groups have good mobility to go alone and mobile without walking gait aid. It was also observed that the study population in both groups found to be under the medium fall risk category regarding BBS. From this result, it was observed that there is significant improvement of TUG and BBS scores in the experimental group and there was no significant improvement of TUG scores and BBS scores in the control group which implies that participants in the control group found no significant improvement in the TUG and BBS scores. It was also observed that the elderly people in the experimental group, participated in OEP found improvement of balance and functional mobility. This results well supported by Shubert et al., 2017 found six months of Otago training decreased TUGT value and changes in the TUGT value indicates that prolonged Otago training decreases the risk of falls. This result is similar with the study done by (AnabelaCorria Martins et al 2020) found improvement of functional mobility in people participated in OEP. Kiik, Sahar, and Permatasari (2019), stated that participation in OEP improves balance and functional activities and they found 8 weeks of training interventions that focused on body balance can reduce the risk of falls. It was also observed that elderly people in the control group, doing regular activities of daily living found no improvement of balance and functional activities Otago training also significantly reduced the risk of falls. The decreased risk of falling was demonstrated through the impairment determined by TUGT. The smaller of TUGT value indicated the lower the risk of falling. This study has few strengths like, this study was carried out among the elderly people in rural population, standardized and structured home based exercise program was used in this study, simple, standardized outcome measures were used to evaluate balance and functional mobility. The sample size was small, the age group was not equally distributed between the groups, the psychological component of the elderly population was not included in this study are the limitations of this study. From the results it was concluded that, OEP is effective in improving balance and functional activities and also reduce the risk of falls in elderly people in rural population.

CONCLUSION:

The observed results show that the functional capacity and balance were improved in the experimental group exposed to OEP home program. It was concluded that Otago exercise program is effective in improving functional capacity and balance in elderly people in rural population. Further studies are needed with large samples including elderly people from different community settings.

Conflict Of Interest

The authors declared that they have no conflicts of interest.

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