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Effect of functional task exercise program on functional activity, balance and quality of life in elderly population.

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ABSTRACT

Background

Elderly group of people are defined as the individuals of 65 years or above. Changes in neuromuscular and musculoskeletal system of an individual's causes restriction in his balance and functional activities because of normal aging process. Hence it is important to study the balance, functional activity and also quality of life. An important strategy for the Reduction or prevention of functional decline during ageing is - regular physical activity and generally physical activity reduces the risk of disease and has a beneficial effect on the impact of a large number of chronic diseases therefore increasing physical activity in elderly is relevant and very important to maintain quality of life.[(15)] Functional Task Exercises can achieve enduring effects because it enhances older people physical capacity, improves motor performance and also because it fits in with daily routine.

Methods

Ethical clearance was taken from institutional ethical committee.The aims and objectives of research were explained and willing participants were included in the study after the written consent was obtained.

Results

A total of 30 elderly people were included. Functional activity measured by FIM Scale before and after the intervention in both the Groups were improved, but more in Group A (FTE) compared to Group B (conventional exercises). Group A showed mean of (104.66 $\pm$ 3.457) before and (108.46 $\pm$ 4.068) after the intervention whereas Group B showed the mean of (103.33 $\pm$ 3.331) before and (105.4 $\pm$ 3.312) after the intervention. Balance which is measured by POMA scale is improved in both the Groups A and B but more in Group A (FTE). 4Before intervention the mean of Group A was (13.13 $\pm$ 1.245) and after was (14.8 $\pm$ 1.060). Group B had a mean of (12.8 $\pm$ 1.146) before and (13.73 $\pm$ 1.163) after intervention. Quality of life was improved more in Group A as compared to Group B with $p<0.0001$ which is extremely significant as the level was set as $p<0.05$. Group A showed mean of (123.33 $\pm$ 4.73) before and (152.27 $\pm$ 5.57) after the intervention and Group B showed mean of (125.06 $\pm$ 5.93) before and (143.20 $\pm$ 3.95) after the intervention.

Conclusion: The study concludes that functional task exercise program along with conventional exercises showed more improvement in elderly than conventional exercises.

Keywords: Elderly, functional task exercises, Balance, Functional activity, QOL.

INTRODUCTION

Elderly group of people are defined as the individuals of 65 years or above. Usually, in elderly individuals, the onset of health problems may occur in early 50s or maybe in 40s. But many times we can also see that people who are at the age of 70 years are healthy and active. [1]3 groups have been identified according to the age ranges[1]:

Classification of elderly[1,2]

1) Young Old – These are population between 65 to 75 years of age.
2) Middle Old – These are population between 75 to 85 years of age.
3) Old-Old – These are population older than 85 years of age.

As the age increases, there is usually a progressive decline in muscular strength in a variety of muscle groups and during different types of muscular contractions. Major functional losses of even the most basic activities of daily living can be seen due to insufficient muscular strength. With aging, the deterioration in muscular strength accelerates and overall age related strength los ranges from 24% to 45 %.[3,4,5]

It is the common observation that with increasing age, the ability to carry out daily functions with vigour and alertness without undue fatigue is decreased i.e. there is decrease in muscular endurance. The ability of muscle to contract again and again against a load, create and sustain tension and resist fatigue over an extended period of duration is called as muscular endurance. Thus factors like pain, reduced muscular strength, reduced muscular endurance, reduced muscle power, reduced balance control contribute in reduced functional activities in elderly.[1]

An important strategy for the Reduction or prevention of functional decline during ageing is - regular physical activity and generally physical activity reduces the risk of disease and has a beneficial effect on the impact of a large number of chronic diseases therefore increasing physical activity in elderly is relevant and very important to maintain quality of life.[6]

Previous research has shown that by comparison with the resistance exercises, functional task exercise (FTE) program is more effective in improving functional performance [7] and that FTE is the first exercise program with sustainable effect. It is assumed that Functional Task Exercises can achieve enduring effects because it enhances older people physical capacity, improves motor performance and also because it fits in with daily routine. This differentiate FTE from other programs in regular use.[6]

FTE is based on state-of-the-art knowledge about human movement sciences, action theory, motor learning, motivation, rehabilitation medicine, development of frailty and cognitive psychology. It is a group based exercise program provided by physiotherapists and it targets daily basic functional activities which are usually affected in early stages of elderly. The main Aim of this program is to increase the functional independence of older adults in daily life.[6]

The program is divided into 3 phases [6]

1) Practice phase of 2 weeks is aimed to learn how the exercises are performed and get used to training.
2) Variation phase of next 2 weeks is aimed to build up the individual's physical capacities.
3) Daily task phase of next 2 weeks is aimed to train situations that closely match the individual's daily activities.

METHODOLOGY

An experimental study was conducted in community dwelling elderly's located in Pune, India.Ethical clearance was taken from institutional Research Committee of Tilak Maharashtra Vidyapeeth, Pune. The aims and objectives of research were explained and willing participants were included in the study after the written consent was obtained.30 elderly were included in the study except those who are bed ridden, those who have undergone any recent surgeries, neurological problems, individuals with assistive devices. Outcome Measures used were Functional Independence Measure Scale (FIM) (ICC = 0.96)[8] Performance Oriented Mobility Assessment Scale (POMA) (ICC = 0.97) [9]Activities-Specific Balance Confidence Scale (ABC) (ICC = 0.94)[10]Older People's Quality of Life Questionnaire (OPQOL) (ICC = 0.95).[11]Sampling was done and 2 groups were formed (Group A and Group B) after meeting the inclusion & exclusion criteria. Group A – Experimental group were given Functional task exercise program and conventional exercises (strengthening and Reactive Balance control exercises) for 3 sessions per week for 6 weeks. Each session included exercises similar to activities of daily

living. Data was collected and statistical analysis was done. Group A were given functional task exercises along with reactive balance control exercises. Group B were given reactive balance control exercises.

RESULTS

Among 30 samples of Elderly, there were 5 males and 25 females. Of these, Group A (FTE) had 3 males and 12 females and Group B (conventional exercises) had 2 males and 13 females.

Elderly Group A performing Functional task exercise program and Group B performing conventional exercises showed mean (104.66 $\pm$ 3.457) and (103.33 $\pm$ 3.331) respectively before intervention. These scores of Group A and Group B improved to mean of (108.46 $\pm$ 4.068) and (105.4 $\pm$ 3.312) respectively after intervention. There is significant improvement in functional activity with (p value = 0.0315) in Group A (FTE) as compared to Group B (conventional exercises).

POMA scores (balance) were significantly improved in Group A (FTE) as compared to Group B (conventional exercise) with the p value of 0.0094. These scores showed mean of (13.13 $\pm$ 1.245) for Group A and mean of (12.8 $\pm$ 1.146) for Group B before intervention and mean of (14.8 $\pm$ 1.060) and (13.73 $\pm$ 1.163) respectively after intervention.

ABC Scores were significantly improved by improving balance confidence in Group A (FTE) as compared to Group B (conventional exercises) with the p value of 0.0247. These scores showed mean of (72.53 $\pm$ 3.067) for Group A and mean of (71.46 $\pm$ 3.20) for Group B before intervention and mean of (76.6 $\pm$ 4.323) and (73.60 $\pm$ 3.33) respectively after intervention.

There is significant improvement in quality of life in Group A (FTE) as compared to Group B (Conventional exercises) with the p value of <0.0001. These scores showed mean of (123.33 $\pm$ 4.73) for Group A and mean of (125.06 $\pm$ 5.93) for Group B before intervention and mean of (152.27 $\pm$ 5.57) and (143.20 $\pm$ 3.95) respectively after intervention.

DISCUSSION

The aim of research was to study the effect of functional task exercise program on functional activity, balance and quality of life in elderly. 30 participants were selected according to the inclusion/exclusion criteria and all the exercises were explained in detail. The demographic details of subjects like age, gender, height and weight were collected. The duration of this study was 6 months. The participants were elderly i.e. above the age of 65 years. They were divided in two groups of 15- Group A and Group B. Group A was given 6 weeks Functional task exercise program with conventional exercises and Group B (control group) was given conventional exercises (strengthening and balance exercises). 3 sessions per week for 6 weeks were planned. A pilot study was conducted and errors were resolved with the approval of the guide.

Before every session, warm up of 10 minutes (walking, moving arms and legs, stretching) and cool down of 10 minutes (static stretching in lying down) after the session was done by every participant. Every session had a 5 or 10 minutes hydration interval in between two circuits. Conventional exercises included strengthening and reactive balance exercises like - Ankle strategy (one leg stance with the trunk erect), Hip strategy(draw lines on floor perform tandem stance and single leg stance with trunk bending) and Steeping strategy (practice steeping on a stool) whereas Functional task exercise program included daily living activities as exercise which included locomotion activities – walking in zig-zag pattern in between cones, picking up clothes from the floor, hang out the washing clothes, talk while carrying objects, dial a number while walking, walk up and down on stairs, sit and stand for 5 repetitions etc.

The participants were assessed for functional activity by using the Functional Independence Measure scale (FIM). The FIM Scale is a 18-item measurement tool that explores an individual's physical, psychological and social function which was filled before and after the treatment protocol. They were assessed for balance control by using Performance Oriented Mobility Assessment scale (POMA) and Activities-specific Balance Confidence scale (ABC). POMA Scale is an easily administered task oriented test measures an older adult's balance and gait abilities which interpret high, medium and low risk of fall assessed before and after the protocol. POMA Scale is a three-point ordinal scale, ranging from 0-2 in which '0' indicates the highest level of impairment and '2' the individual's independence. In POMA, the total Balance score is 16 and total Gait score is 12 so the total test score is 28 with the Interpretation: 25 – 28 = low fall risk, 19-24 = medium fall risk and <19 = high fall risk.

ABC Scale is a self-report measure of balance confidence in performing various activities without losing balance or experiencing a sense of unsteadiness and

choosing one of the percentage points on the scale from 0% to 100%. It was taken before and after the treatment protocol and OPQOL Questionnaire, which includes 35 items with five answer options to assess quality of life checked before and after the protocol. Quality of life of the participants was measured by Older People's Quality of Life questionnaire (OPQOL) which has 35 questions with 5 options to mark from strongly disagree to strongly agree so higher the score, higher is the quality of life. The pre and post intervention values were recorded and data was collected. Data obtained was statistically analysed and a value of significance was set as $p<0.05$.

Functional activity measured by FIM Scale before and after the intervention in both the Groups were improved, but more in Group A (FTE) compared to Group B (conventional exercises). Group A showed mean of (104.66 $\pm$ 3.457) before and (108.46 $\pm$ 4.068) after the intervention whereas Group B showed the mean of (103.33 $\pm$ 3.331) before and (105.4 $\pm$ 3.312) after the intervention.

Balance which is measured by POMA scale is improved in both the Groups A and B but more in Group A(FTE). 4Before intervention the mean of Group A was (13.13 $\pm$ 1.245) and after was (14.8 $\pm$ 1.060). Group B had a mean of (12.8 $\pm$ 1.146) before and (13.73 $\pm$ 1.163) after intervention.

Quality of life was improved more in Group A as compared to Group B with $p<0.0001$ which is extremely significant as the level was set as $p<0.05$. Group A showed mean of (123.33 $\pm$4.73) before and (152.27 $\pm$ 5.57) after the intervention and Group B showed mean of (125.06 $\pm$ 5.93) before and (143.20 $\pm$ 3.95) after the intervention.

CONCLUSION

The study concludes that functional task exercise program along with conventional exercises showed more improvement in elderly than conventional exercises.

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