

EFFECTIVENESS OF SHORT DURATION AEROBIC EXERCISE PROGRAMME ON CARDIORESPIRATORY HEALTH AND FALLS AMONG GERIATRIC SEDENTARY MALE INDIVIDUALS - A SIMPLE EXPERIMENTAL STUDY

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Abstract-

BACKGROUND: Sedentary geriatric population includes older adults whom do spend most of their awake time in sedentary activities and they do also depend on others for activities of daily living. This leads to cardiovascular disorders, metabolic disorders, musculoskeletal disorders and most commonly loss of proprioception, muscle power and balance which leads to falls in elderly. According to the World health organization older adults aged 60 should do at least 150 minutes of moderate to vigorous physical activity in a week to lead a healthy and disease free life. The main purpose of the study is to find the effectiveness of short term aerobic exercise on cardiorespiratory health and falls among geriatric sedentary individuals.

AIM & OBJECTIVE: To find out the effect of short term aerobic exercise programme on cardiorespiratory health and falls among male sedentary geriatric population.

METHODOLOGY: 20 male older adults of age group 60- 70 years, who fulfilled the inclusion Criteria were selected. Out of 25 subjects of geriatric population who have no medical or clinical disorders and who is able to cooperate was included. The intervention is home based programme with routine follow up and increment protocols as per the individual.

RESULT: The pretest and posttest mean values of cardiorespiratory health (SIX MINUTE WALK TEST) was analyzed using the paired 't' test. For 19 degrees of freedom and 5% level of significance, the table 't' value is 1.729 and calculated 't' value is 13.66. Since the calculated 't' value was greater than table 't' value null hypothesis is rejected. The pre-test and post-test mean values of falls (BOOMER SCALE) was analyzed using the paired 't' test. For 19 degrees of freedom and 5% level of significance, the table 't' value is 1.729 and calculated 't' value is 80.60. Since the calculated 't' value was greater than table 't' value, null hypothesis is rejected.

CONCLUSION: This study can be concluded that application of short term aerobic exercise programme shows significant improvement in cardiorespiratory health and falls in male geriatric sedentary individuals.

Keywords: Geriatric population, WHO – World Health Organization, Six minute walk test (6MWT), BOOMER –Balance Outcome Measure for Elderly Rehabilitation.

INTRODUCTION:

Sedentary behavior is one of the most emerging risk factor for health. Geriatric population is being exposed to this behaviour most commonly due to lack of physical activity and also they do spend most of their awake time in sedentary activities. Being sedentary makes the individual to loss physiological functioning of the body and this leads to health consequences that includes cardiovascular disease, falls, obesity, metabolic syndrome and musculoskeletal diseases like bad posture, fatigue, joint pain, limited mobility, poor balance, falls .Sedentary behaviours are characterized by any waking activity that requires an energy expenditure ranging from 1.0 to 1.5 basal metabolic rate and a sitting or reclining posture. Epidemiological studies also reveals that considerable amount of human's waking hours are spent in sedentary activities, creating a new public health challenge. It has been reported that adults older than 60 years spend approximately 80% of their awake time in sedentary activities which represents 8 to 12 hrs per day. Typical sedentary behaviours include television viewing, computer use, sitting time that includes isolated sitting. Researchers call this as 'sitting disease'. Sedentary behavior is also distinct from both active and passive standing behaviours. Sedentary behavior is therefore not merely the absence of moderate to vigorous physical activity and may be reduced through increasing sit to stand transitions, standing time or light physical activity (including active sitting). Inactivity is

associated with alterations in body compositions resulting in an increase in percentage of body fat and decrease in lean body mass. The hallmark sign of aging is sarcopenia and this leads to reduced endurance level. Thus significant loss in maximal force production is associated with lack of physical activity. Consequently low physical performance and dependence in activities of daily living is common among older people. The older adult population is increasing substantially and the risk of non-communicable disease increases with age. Also the World Health Organization has created many recommendations for behavior change to reduce the risk of non-communicable disease among elderly. It is well established that physical activity plays a key role in the prevention of diseases due to its close relationship with many of the diseases. The sedentary behavior (SB) and physical activity (PA) are the most important factors to be considered in health for older adults. Physical activity is the influencing factor for healthy aging. There are several strategies to reduce the impact of sedentary behavior in older adults. The physical activity is the intervention to overcome the sedentary behavior. According to National Institute of Health people were intended to be bipedal. Also it is important to take regular breaks from sitting and engage in physical activity to prevent the negative consequences of sitting disease. The physical activity intervention session being the motivational sessions could lead to meaningful gains in physical function in frail older adults. The intervention did not lead to decrease in total duration of sedentary behavior, however breaks in sedentary time did increase. This suggests that braking up periods of prolonged sitting may be more acceptable than attempting to reduce overall sedentary time for some older adults and can lead to positive functional health outcomes and can improve the quality of life.. The short duration aerobic exercise, a method of geriatric rehabilitation includes physical activity along with recreational activities done for particular duration to avoid sitting duration. Physical activity is defined as any bodily movement produced by skeletal muscles that require energy expenditure. Exercise is the subcategory of physical activity that is planned, structured and repetitive and that has a final or intermediate objective for improvement or maintenance of physical function. According to centers for disease control and prevention adults aged 65 and older need at least 150 minutes of physical activity for a week that includes moderate to vigorous physical activity along with balance exercises and muscle strengthening. The dose of physical activity is determined by duration, frequency, intensity and mode. For optimal results, the older person should adhere to prescribed exercise program and follow the overload principle of training i.e., to exercise near the limit of maximum capacity to challenge the body systems sufficiently, to induce improvements in physiological parameters such as vo2 max and muscle strength. Improvements in mental health, emotional, psychological and social wellbeing and cognitive function are also associated with physical activity. The exercise intervention from WHO includes both aerobic exercise and strength exercise as well as balance exercise to reduce the risk of falls. The aim of the study is to find the effect of short duration aerobic exercise on cardiorespiratory health and falls among geriatric individuals.

METHODOLOGY:

It was a simple experimental study of 20 subjects from geriatric population. The study setting was at patient's home which is a home based intervention and the study duration is about 3 months and the study sampling was convenient sampling technique. Inclusion criteria includes male geriatric population with age ranging from 60 to 70 years of age, geriatric individuals who can understand and co-operate throughout the session, individuals with no other clinical disorders. The exclusion criteria includes geriatric individuals with clinical disorders, non-cooperative, individuals with poor vision, hearing and balance. The parameters used for the analysis of cardiorespiratory health and quality of life includes three minute walk test and quality of life questionnaire.

PROCEDURE:

The aim and objectives of the study was explained to the participants of the study. 20 subjects were chosen based on inclusion and exclusion criteria. The subjects were clearly explained about the study procedure and exercise programme. The subject is instructed to present on particular date and time. Cardiovascular health and falls in elderly were assessed using 6 min walk test and falls (BOOMER) scale. The treatment regimen was given and post intervention measures were also taken.

TREATMENT TECHNIQUE:

SHORT DURATION AEROBIC EXERCISE:

Frequency : Three times per day

Intensity : RPE (based on the rate of perceived exertion)

Type : Functional activities and Aerobic activities (walking on both soft and rough surface)

Duration : 4 weeks (Weekly progression)

S.NO	WEEKLY INTERVENTION	EXERCISE REGIMEN(AEROBIC ACTIVITY)	FUNCTIONAL ACTIVITY(SHOULD BE DONE INDEPENDENTLY)
1	WEEK 01	WALKING - 10 MIN DAILY	ACTIVITIES OF DAILY LIVING

2	WEEK 02	WALKING - 15 MIN DAILY	ACTIVITIES OF DAILY LIVING
3	WEEK 03	WALKING – 20 MIN DAILY	ACTIVITIES OF DAILY LIVING
4	WEEK 04	WALKING – 30 MIN DAILY	ACTIVITIES OF DAILY LIVING

The activity was progressed based on the coordination level, mental processing level and balance level of the geriatric individual.. Activity log sheets were maintained for the range of improvement during each week and final assessment was done after four weeks of intervention.

DATA ANALYSIS:

SIX MINUTE WALK TEST:

Mean values (s)		Calculated 't' value	't' Table 't' value	Level of Significance
Pre test	Post test			
23	38.75	13.66	1.7291 (one tail)	P < 0.05 Significant

The pre test and post test mean values of six minute walk test was analyzed using the paired 't' test. For 19 degrees of freedom and 5% level of significance, the table 't' value is 1.729 and calculated 't' value 13.66 . Since the calculated 't' value was greater than table 't' value null hypothesis is rejected.

BALANCE OUTCOME MEASURE FOR ELDERLY REHABILITATION: (BOOMER)

Mean values (questionnaire)		Calculated 't' value	't' Table 't' value	Level of Significance
Pre test	Post test			
15.6	0.81	80.60	1.7291 (one tail)	P < 0.05 Significant

The pre test and post test mean values of BOOMER SCALE was analyzed using the paired 't' test. For 19 degrees of freedom and 5% level of significance, the table 't' value is 1.729 and calculated 't' value 80.60. Since the calculated 't' value was greater than table 't' value null hypothesis is rejected.

RESULTS:

The pretest and post test analysis of cardiorespiratory health and falls was assessed using six minute walk test and balance outcome measure for elderly rehabilitation was assessed using balance outcome measure for elderly rehabilitation (BOOMER) and the test score revealed that there was a significant improvement in cardiorespiratory health and falls after the application of functional activities and recovery activities in geriatric sedentary individuals.

DISCUSSION:

The aim of the study was to find the application of short term aerobic exercise a method of geriatric rehabilitation on cardiorespiratory health and falls in sedentary geriatric population. The geriatric group of individuals spend most of their awake time in sedentary works and most of them become dependent on others for their daily activities because of psychological adaptation to aging. Aging results in both structural and functional changes in body. The most common functional change is seen in cardiorespiratory health. The aged heart diminishes its ability to respond to increased workload and decrease its reserve capacity. Also the following changes occurs. It includes decreased oxygen consumption by 50 %, decreased arteriovenous oxygen difference by 25%, decreases heart rate by 25% and decreased ejection fraction by 15% and vo2 max decreases by 50% from age 20 to 80 years. The age related respiratory changes includes decrease in measures of lung function, decrease in peak airflow. Aging also leads to musculoskeletal changes which leads to atrophy of skeletal muscles and increased joint degeneration thus leading to reduced balance and lack of equilibrium and proper base of support. Normal exercise induces an increase in stroke volume and heart rate in order to increase overall cardiac output. There is a good deal of evidence that aerobic exercise programs can provide improvement in peak oxygen consumption and its components increases in ventilator threshold and submaximal endurance for older persons. The physical activity in the form of aerobic exercise improves respiratory muscle cell function, the lung function improves and thus causes better delivery of oxygen through lungs and body. A longitudinal study in older males studied in the upright position indicates that an enhanced physical conditioning status increases oxygen consumption and work capacity, in part by increase in the maximum cardiac output by increasing the maximum stroke volume and in part by increasing the estimated total body arteriovenous oxygen difference. Application of short

term aerobic exercise along with recovery activities which includes independent ADL and functional training improves joint stability, muscle strength and improves base of support and equilibrium and thus balance improves. Improved balance leads to reduced episodes of falls in geriatric group.

CONCLUSION:

The aim of study is to find out the effect of short term aerobic exercise on cardiorespiratory health and falls in sedentary geriatric population. 20 geriatric sedentary individual cases were selected and assessed. The cardiorespiratory health was measured using six minute walk test and falls in elderly was assessed using balance outcome measure for elderly scale. Both were measured before and after the four weeks after intervention and their results were analyzed using paired 't' test.

This study concluded that short term aerobic exercise has improved cardiorespiratory health and prevented falls episodes in sedentary geriatric population.

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