Physical Activity in Geriatric Population: A Narrative Review

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Abstract

Physical inactivity is among the leading cause of mortality and reduced quality of life. With increasing age, there is a decline in homeostasis which ameliorates the effect of being physically inactive. Physically inactive middle-aged men and women (doing less than 1 hour of exercise per week) have 52% increased chances of death, two times increased risk of cardiovascular associated mortality rate and 29% more chances of cancer-related death compared to physically active women. The physical activity is a modifiable risk factor which can be modified and is cost effective. The practicing health care providers can act as a catalyst to improve the physical activity. It’s of utmost importance to understand the recommended physical activity to promote and prescribe physical activity as tool to enhance the health of older adults. The review aims at highlighting the basic variables associated with physical activity.

Keywords: Physical Activity, Geriatric population, Activity, Exercise, Aerobic exercise, Exercise Recommendation

Introduction

With the passage of time, world has observed the ageing of population[1]. Increasing graph of economic well-being, good health care system has significantly reduced the mortality rate resulting in the increased percentage of geriatric population of the globe[2]. However, old age comes with a lot of diseases and infirmities[3]. Nearly half of the people aged over 60 years are physically inactive[4]. Physical inactivity is recognized as the fourth most important risk factor for worldwide mortality (6% of death)[5]. Various long-term prospective follow-up studies (including mostly men, lately women also) have evaluated the risk of mortality due to any cause or ailments (e.g., cardiovascular disease) are related to physical inactivity[6],[7]. It has been observed that physically inactive middle-aged women (doing less than 1 hour of exercise per week) have 52% increased chances of death, two times increased risk of cardiovascular associated mortality rate and 29% more chances of cancer-related death compared to physically active women[6],[7]. The incidences of physical inactivity is greater than the other modifiable risk factors[8]. These risks are similar for the population with hypertension, hypercholesterolemia and obesity[9]. On the other hand, both males and females who reported improved levels of physical activity and health were brought to have reduced relative risks[10].

World health organization describes physical activity as a bodily movement produced by skeletal muscles that requires energy expenditure. Consistent physical activity supports to control body functions correctly and even reverse some of the chronic conditions to keep older people mobile and independent[11],[12]. Despite the high benefits of physical activity, in our country, some older people still consider physical activity as an unnecessary or even potentially harmful process[13]. In addition to that the sedentary lifestyle of older population triggers the health condition resulting in serious ill health, disease and weakness[14]. Several systems have been formed to endorse physical activities amongst older people, but significant encouragement for regular activity is still challenging. Moreover, it look like that people who are fit however have other risks for cardiovascular disease may be at lesser risk of early death than individuals who
are inactive with not any risk factors for cardiovascular disease[15]. Problem arises when application of physical activities becomes challenge due to the various factors with respect to the elderly population. The right amount of recommendations for the physical activities from healthy adult population to older adults, assessment of the physical fitness of elderly populations with or without medical conditions and understanding of the concepts of the benefits of performing regular physical activities is still a challenge. This study aims to summarise the data from the evidence to offer an indication of this multifaceted topic and present a guide for balanced approach.

**Recommended Physical Activity in Older Adults**

According to the ACSM guidelines, recommendation is related to fit adults between 18 and 65 years of age, and to individuals with chronic disorders not related to physical activity (for example hearing impairments) coming under this age[16]. The current guidelines identify that regular physical activities promotes good health and reduce the risk of any disease and premature death. The recommendation implies according to the frequency, intensity, time and type of the physical activities. The dosage of the physical activities varies from the age to age. The amount of exercises is divided into moderate and vigorous exercises. The moderate exercises involve longer duration and repetition whereas the vigorous exercises have shorter duration. According to the guidelines, the older adults with age more than 60 years but no chronic conditions can perform vigorous activities and moderate activities with no complication. The adults with age between 50-64 years with some chronic condition needs to perform moderate activities[16],[17],[18]. The adults with age more than 64 years and have some chronic condition should perform light activities only. The physical activities are divided into aerobic activities, muscle strengthening, and flexibility exercises[17].

- **Aerobic Activity**: In order to endorse and sustain good health, adults aged between 18-65 years need to perform aerobic activities with moderate intensity for five days per week for 30 minutes or can perform 20 minutes of vigorous intensity aerobic activities for three days per week, regularly. Person can also perform a mixture of moderate as well as vigorous intensity aerobic exercises in order to meet the recommendations[17]. For e.g., an adult can start with the brisk walking for 30 minutes for two days in a week and then continue with the jogging of 20 minutes on the next two days of the week. Brisk walking which is moderate intensity aerobic activity markedly increases the heart rate can be performed for minimum of 30 minutes and its effects stretches up to next 10 minutes. Vigorous intensity aerobic activity illustrated by jogging rapidly increases the heart rate due to the significant increase in the breathing. This suggested extent of aerobic activities should be added with the light intensity activities of daily living (e.g., personal-care, home economics, walking or grocery shopping, walking-nearby home or office). The guidelines also recommend that the older adults of age more than 65 years with some chronic condition needs to perform light-intensity aerobic activities[16],[17]. For e.g. walking in the garden for 30 minutes for 5 days in a week. This can be summed up with the regular daily activities like gardening, fishing, playing with the kids etc.

- **Muscle-Strengthening**: Good health and physical fitness brings independence to carry out basic regular activities in later stages of life. Muscle strengthening is a major component of physical wellness which needs to be performed for a minimum of two days a week[16],[17]. Muscle-strengthening procedures consist of an advanced weight-training program, stair climbing, and resistance exercises using main muscle groups. According to the guidelines 8-10 strengthening exercises for the major muscle groups of the body to be executed for two or three non-consecutive days per week. In order to get the best out of strength improvement, a resistance in the form of weight to be used
which permits 8–12 repetitions of individual exercise causing the volitional exhaustion[16],[17]. Literature supported that the health benefits of muscular strengthening activities and improved endurance in adults has increased quickly in recent years[19],[20]. For example, weight bearing in the form of resistance exercise increases the bone formation in youngsters and reduces the bone loss in elderly. Apparently, this results in lowering the risk of osteoporosis and bone fracture in both the age groups, especially in the elderly[21]. Resistance exercises at least two days a week offers a harmless and effective technique to enhance the muscular strength and endurance.

- **Flexibility and Balance Exercises:** As the age increases the ability to maintain balance decreases and thus decreases the flexibility of the body. Evidence has supported that the addition of flexibility and balance exercises in the physical regime of the adults helps to maintain the overall physical fitness in the advanced stage of life[22],[23]. The guidelines recommend that the older adult with age of 60 years or above should perform flexibility exercises at least two days a week [24]and those who are at risk of fall should add balance exercises also in the exercise program[17]. In addition to identifying specific type of activity, care should be taken to categorize, how, when, and where the activities to be implemented. People with chronic conditions should have an activity plan which adds prevention and treatment in the program. Older adults who do not match with the recommended levels, program should involve a progressively gradual approach to enhance physical activity with time using various levels with interval in between the program as compared to the continues exercise program. Self-monitoring of the physical activities on regular basis should also be encouraged among this population.

**Measurement of Physical Activity**

The progressively increasing frequency of the risk factors with ageing leads to the deterioration in many physiological systems; reduced muscle mass, decreased balance control, reduced muscle strength and endurance and major decline in cognitive performance, which effect the functional independence. For older adults, maintenance of the functional independence is an important factor with the extension of life in order to maintain good quality of life. Correct volume of physical activities helps to make life of an older adult active and independent. In order to prescribe the physical activities, it is very important to measure the extent of person ability and level of exertion. It is very essential to understand the concept of measuring the levels and intensity of the physical activity.

- **MET (Metabolic Equivalent)**

This is one of the most used methods to calculate the intensity of physical activity. MET indicate the total amount of energy expenditure during any physical activity[25]. One MET is approximately equalling to the energy consumed during rest. Physical activities should be designed in a manner that the energy expenditure from various activities produces collection of MET values. For example, bicycling with a speed of 5.5 mph has 3.5 MET values and cleaning house has 1.8. Any physical activity below 3.5 METS (corresponds to more than 3 hours of brisk walking per week) does not produce any health-related variations in adults. On the other hand, the older adults with mobility issues have higher metabolic expended values of activities as compared to the average adult[26]. Hence, the relative difference should be considered when advising the physical activities to the persons with mobility impairments. Moreover, a person with no mobility impairments and sedentary lifestyle, the light activities does not reach to the high levels of energy expenditure to improve health.
• Perceived rate of exertion

Literature has supported another readily understandable intensity-based rate of self-perceived exertion scale[25]. The scale is marked from 0-10 with 5-6 scores moderate intensity exercise and 7-8 scores vigorous-intensity exercise 28. The ACSM recommendations simplify the physical activity on PRE scale by defining sitting as 0 and greatest possible effort is 10 with moderate-intensity exercise being 5 or 6 and causing small improvements in respiratory and heart rate, vigorous-intensity activity producing large changes in respiratory and heart rate[27].

• Pedometers and accelerometers

Other tools to measure the energy expenditure are pedometers and accelerometers which have gained significant acceptance as a reliable approach of measuring physical activity objectively[25]. Pedometers are low-cost effective mechanical tools which determine the total number of footsteps somebody takes throughout the day by sensing the vertical motion while walking[28]. Whereas, accelerometers measure acceleration in more than one plane of motion and can give information of the frequency, intensity and duration in different types of movement. Pedometers are inexpensive, simply manageable, and provide a discreet data which is to be collected by performing daily activities. In elderly population, data of 2-3 regular days can be taken as a consistent indicator of regular daily physical activities, irrespective of the fact that how many steps need to be taken per day[29],[30]. Literature supports the evidence that an elder adult completing 10,000 or more steps every day is considered as highly active, more than 5000 is considered as moderately active and steps equals to or below 5000 are to be considered as inactive[30]. On the other hand, accelerometer provides a detail information of activities all over the day, with respect to the day timings, high intensity activities or low intensity activities, period of rest or inactivity and period of activities[30]. Performing physical activities on regular basis has several benefits. Literature has supported the fact that the number of populations performing physical activities tend to have longer and healthier life span as compared to the inactive population.

Benefits of physical activity

According to the recent studies, evidence has supported the fact that people with higher physical activities level and physiological wellness have low mortality risk factors[31]. Maintenance of a physically active routine from middle age and continuing to the older age results into a good quality of life [32]. Hence, the more physically active a person is, the more is the physical fitness. This is because of the improvements in physiological systems, especially in cardiovascular system with enhanced oxygen carrying capacity and distribution of nutrition in the body[33], neuromuscular system for the balance and coordination[34], and metabolic system which regulates the glucose and fatty acid metabolism[35], which increases overall aerobic capacity and physical fitness. Thus, helps to maintain the activities of daily living easier in old age.

The aerobic exercises involve large muscle groups of the body to move in a rhythmic for a constant time. This has been shown to increase the arterial wall elasticity in old age thus decrease the chances of atherosclerotic changes in the vessel walls[36],[37]. The strengthening exercises of the major muscle groups helps to provide the strength required to carry out daily activities[17]. Strengthening exercises are also known to counteract the effect of age-related sarcopenia in older age by improving the strength and function [38],[39]. The balance exercises work on the adaptation and habituation exercises which helps to minimize the risk of fall in older adults thus reduces the chances of injury[40],[41]. Flexibility
exercises helps to remain flexible and fragile in the advance stages of life which ultimately help to remain proactive to carry out various activities in routine[22]. In addition to its regular physical activities help to improve memory and cognition in old age[25], improves sleep[42], prevent various lifestyle disorders[7] and thus, improves the quality of life[43],[44],[45]. Also, literature supports that physical activities are well-known to decrease cardiovascular risk factors in any age group[46],[47]. These activities bring favourable adaptations in the common risk factors of cardiovascular diseases by lowering the heart rate at rest and during exercises, slightly increase in blood pressure, and increased glucose transport in the muscle spindle[47].

**Barriers to physical activity in elderly**

In-spite of the well-known benefits of the physical activities some older people still believe that physical activities are unnecessary and of no use. Implementation of regular exercises in the geriatric population is a challenge with lack of interest in performing any physical activities[48]. Apart from the interest, language is one of the biggest barriers in older adults. In a country like India, older generation is not well educated which leads to the lack of concept of prevention and healthy aging and explanation of the physical activities becomes a challenge to them which ultimately reduces the interest of performing the activities[49]. There are a number of barriers other than this including the environmental changes and related co-morbidities in the older generation which prevents them to perform any activities[50]. Lack of group or peer mentor motivation in elderly because this generation is highly cultural and gender sensitive and lack of mentoring[51]cause another type of barrier in maintaining regular physical activities.

**Conclusion**

Practically all elderly population should be physically energetic. An adult with any medical illness the physical activities should be implemented as intake of drug in regular routine so that it accelerates the improvements. In addition to that, an older adult with medical disorders should performs the physical activity in a regular way that it reduces the risk of developing other chronic diseases and prevention of deterioration of the present illness as described above. With the help of given evidences, physical activities should be considered as one of the highest priorities in the regime of elderly treatment for prevention and treatment of the disease and disabilities in later stages of the life. An effective intervention that improves physical fitness in older adults deserves wide promotion and implementation. There is exceptional evidence in the literature that physical activities do wonders in old-age which involves improvements in cardiovascular system, neurological system, improving quality of life. The recommended activities should be tailored according to the individual’s capability and each adult should be sensitized about the tremendous benefits of the physical activities.

**References**


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