



Stay fit, don't quit: Geriatric Exercise Prescription in COVID-19 Pandemic

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Starting in December 2019, an increasing number of cases infected with novel corona virus disease (COVID-19) have been identified in a multimillion city in Central China [1]. Since then, infections have been extended all over China and consequently the world. In a very short time, COVID-19 has reached pandemic proportions with a tendency of further large-scale spread. Thus, since person-to-person transmission is required for the extensive spread of COVID-19, governments from various countries have proposed a self-quarantine approach to minimize the spread of the COVID-19 and, therefore, protect its citizens. Older adults, especially those with co-morbidities, such as diabetes, pulmonary disease, and other chronic conditions have been identified as the most vulnerable and thus prone to becoming infected with COVID-19 [2]. Depending on the country, different measures of self-quarantine have been proposed, but the commonality is that people older than 65 should stay at home to avoid the risk of contamination. Furthermore, even younger individuals suffering from one or more chronic diseases have also been encouraged to stay at home during the period of pandemic. Although these countermeasures prevent older people from being infected, the downside is that the actions taken by different governments have led to restricted movement and potentially endangered older people's health. It has been shown that 2 weeks of daily step reduction (< 1000

steps/day) contributed not only to loss of muscle mass and strength but also impaired glycemic control and inflammatory status. In relation to COVID-19, evidence shows that regular exercise improves immune function [3] and can potentially protect older adults from infections. Since older people are spending most of their time in sedentary pursuits and that such behavior can lead to serious health consequences, identifying an effective indoor exercise regimen that could alleviate possible implications posed by lack of movement should be a priority.

To date, the most detailed guidelines for exercise prescription for older adults are developed by American College of Sports Medicine (ACSM) and American Heart Association (AHA), but also guidelines by the Center for Disease Control (CDC) and World Health Organization (WHO) are often referenced [4]. There is a general consensus that 150 min per week of moderate-intensity aerobic exercise, dispersed into 3–5 days (sessions), is required for optimal health. However, if these aerobic sessions are of vigorous intensity, 75 min per week is sufficient to maintain optimal health and functionality. Notably, intensity is highly subjective and is dependent on person's age, health status and fitness level. Thus, intensity should be adjusted in accordance with the abovementioned factors. The easiest way to determine exercise intensity is to use scales of perceived exertion [5]. It is also suggested that aerobic sessions should be equally divided (i.e. 30 min per session to reach 150 min per week). In addition to aerobic exercise, older adults are also advised to engage in resistance exercise at least two times per week on non-consecutive days. Resistance training should be designed to include 8–10 exercises (involving major muscle groups) allowing 1–3 sets per exercise while performing 10–15 repetitions per set. Of particular importance for older adults are flexibility and balance exercises which can reduce the risk of falls and promote mobility. Generally, older adults should implement flexibility exercises at least two times per week accumulating 10 min of

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stretching per day. If there is a substantial risk of falling, older adults are encouraged to put an emphasis on balance exercises 3 days per week.

Given the current circumstances, many older adults are only able to perform physical exercise in a home setting. Knowing that the majority of households are lacking any training equipment, it is crucial to draw attention to bodyweight exercises which, when performed correctly, are safe and effective. To simplify their exercise routine, older adults might be able to exercise using chairs, wall, and floor to perform bodyweight exercises [6, 7]. Chair-assisted exercises are created in a way to facilitate frail and sedentary individuals' exercise regimens. Such exercises could effectively improve their strength, balance, coordination, and range of motion. Exercises like Achilles stretch, knee bends, hamstring press-backs can be performed in a standing position and no additional props needed except the chair. There is also a myriad of simple exercises that could be implemented by using the wall or the floor (wall-push-ups, wall-crawls, wall-sits, straddle stretch, hip tuck, etc.). However, using a mat or some other soft surface is recommended while performing the floor exercises. Abovementioned examples present a small portion of body weight exercises that elderly could perform on a daily basis to keep themselves physically active. Aerobic exercises are the most difficult to replicate in a home setting, but alternatives such as walking around the house and climbing stairs can be a good replacement. In case an individual possesses exercise equipment such as treadmill, ergometer, elliptical machine, dumbbells, kettlebells, resistance bands, suspension bands, pilates balls, bosu balls or medicine balls, this can only enrich bodyweight training and expand the spectrum of exercise that can be done at home.

To obtain additional gains associated with regular exercise, progression can be carried out as tolerated. Variables such as exercise intensity and frequency, rest periods and training volume can be manipulated to maximize health benefits. However, caution must be taken and these variables have to be adjusted gradually after general practitioner approves that a person is eligible to exercise. Indeed, older adults who were guided to perform exercise by their physician performed more moderate-to-vigorous intensity exercise than those who did not receive any exercise recommendation [5]. Physically inactive adults with known chronic disease should seek medical clearance before starting an exercise program, irrespective of intensity.

Special emphasis should be placed on pharmacological interactions with exercise. Many older adults are using long-term medications which sometimes do not operate well together. A typical example would be an interaction between an acute hypotensive effect of intense aerobic exercise and prolonged antihypertensive medication treatment.

The purpose of home-based exercises is to maintain and improve overall health, foster functional independence and prevent potential disease aggravation posed by lack of movement. Despite current movement restriction brought by COVID-19 pandemic, it is crucial for older adults to stay active and preserve and improve their health status.

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Compliance with ethical standards

Conflict of interest The authors declare no conflict of interest.

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