EDITORIAL

Risk of Increased Physical Inactivity During COVID-19 Outbreak in Older People: A Call for Actions

The World Health Organization labeled coronavirus disease 2019 (COVID-19) a "public health emergency of international concern," declaring it a pandemic in March 2020, with approximately 1,910,000 cases and greater than 123,000 deaths worldwide.[1] Case-fatality rates dramatically increase with age, starting at approximately 0% to 1% in individuals aged between 20 and 59 years and scaling up to approximately 8% to 13% in individuals between the ages of 70 and 79 years and approximately 15% to 20% among those 80 years or older.[2]

Given the lack of available evidence-based treatments and vaccines for COVID-19, public health actions are of the utmost importance, with social distancing being recommended for infection control.[3,4] Despite the latter's positive effects on disease spread, the potential increase in sedentary behavior due to isolation can be detrimental to health. An abrupt reduction in activity levels, as would likely happen with social isolation, is of particular concern in older individuals, who are typically more inactive than their younger counterparts[5] and prone to frailty, sarcopenia, and chronic diseases.

Mechanical unloading of muscles resulting from periods of inactivity may lead to a transient exacerbation of age-related muscle waste, accelerating the progression of sarcopenia and the development of comorbidities.[6,7] Bed rest and limb immobilization have served as informative models to investigate the impact of drastic inactivity on muscle health, with literature consistently showing them to induce significantly greater muscle atrophy after only 5 to 10 days than seen annually in the older population.[8] Lessons learned from step-reduction models are even more useful, as they represent physical inactivity imposed by isolation more accurately. Reducing daily steps (to ~1,500 steps/day) has been shown to reduce leg fat-free mass by approximately 4% over 14 days in older individuals.[9] Although the actual repercussion of the COVID-19 pandemic on physical inactivity remains unclear, wearable trackers (i.e., Fitbit) provide preliminary estimates of the impact of current social distancing on daily step counts. Data from 30 million users worldwide estimate a decline in step count of approximately 12% in the United States (when comparing the week of March 22, between 2019 and 2020), and even greater in other countries (e.g., 38%, 25%, and 15% in Spain, Italy, and Brazil, respectively).[10]

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Muscle mass is associated with strength, a strong, independent risk factor for all-cause mortality in older people.[11] Two weeks of inactivity (75% daily step reduction) has been shown to decrease muscle strength in approximately 8%, and despite a seemingly low value, 2 weeks of rehabilitation were ineffective in recovering muscle function, emphasizing the impact of abrupt reductions in physical activity in an already vulnerable population.[12] In addition to its impact on muscle mass and function, reducing steps to approximately 1,000 to 1,500 steps/day has been shown to worsen glucose handling (skeletal muscle is the main glucose disposal site), which was accompanied by increased inflammation and anabolic resistance.[9]

Considering the impact of abrupt inactivity on overall health, strategies to mitigate the potential negative effects of isolation are of paramount importance. To this extent, resistance exercise emerges as a classic and proven method to increase muscle mass, strength, and functionality, even for nonagenarians.[13] Home-based exercise programs can be invaluable during isolation, constituting a feasible strategy to maintain or even improve muscle health and functionality, helping to prevent falls (a common cause of disability) and hospitalization.[14]

The annual number of deaths attributed to physical inactivity has been estimated to be over 5 million globally.[15] It is undisputed that measures of social isolation are required to counter the spread of COVID-19 and to avoid the collapse of health systems. However, we should also consider that increased inactivity has the potential to scale up morbimortality among older people, particularly if social isolation persists for longer periods. We believe it is critical that the international and national policy makers reinforce the importance of the older population to achieve the recommendations for physical activity—thoroughly described in Table 1 [16]— during quarantine. A task force involving governments, universities, funding agencies, and professional healthcare associations should be implemented to develop, test, deliver, and monitor evidence-based physical activity programs aimed at increasing, or at the least maintaining, physical activity levels in older individuals. Moreover, clinicians should prescribe home-based, resistance exercises "as medicine" for all older individuals. Remotely tracking and motivating adherence to physical activity programs is also important. Patients' health education should include recommendations to introduce light activity in their daily routine, focusing on sitting less and moving more, which is particularly relevant for patients

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Table 1. Evidence-Based Physical Activity Recommendations for Older Adults (Aged ≥65 Years) to Improve Health

✓ Perform at least 150 minutes of moderate-intensity aerobic physical activity, or at least 75 minutes of vigorous-intensity aerobic physical activity, per week. An equivalent combination of moderate- and vigorous-intensity activity is recommended.
✓ Aerobic activities should be performed in 10-minute bouts (minimum duration).
✓ For additional health benefits, weekly moderate- or vigorous-intensity aerobic physical activity should be increased to a total of 300 and 150 minutes per week, respectively. Equivalent combinations of moderate- and vigorous-intensity activity are recommended.
✓ Older adults with mobility issues should focus on physical activities to enhance balance and prevent falls on 3 or more days a week.
✓ Muscle-strengthening activities involving major muscle groups should be performed on 2 or more days a week.
✓ When recommendations cannot be met due to health conditions, older adults should be as physically active as their abilities and conditions allow.

Note: Adapted from the World Health Organization's recommendations.[16]

with mobility issues or low income with restricted access to adequate equipment/space. Breaking up prolonged sitting time with light strolling or standing (e.g., during commercial breaks while watching television), household chores (e.g., cleaning and gardening), and physical leisure activities (e.g., dancing and short-distance walking) also count as physical activity and could prevent excessive sedentary behavior.[17] Family support may help to encourage older relatives to be more physically active. Joining them (personally or even remotely) in any form of physical activity can be important for adherence and emotional support.

We propose a research agenda to address urgent underlying questions: (1) What is the actual impact of social isolation on physical activity levels? This could be preferably investigated via objective assessment tools (accelerometers and pedometers); however, because social isolation may impair its provision to participants, self-reported physical activity also provides important data at the population level. (2) What is the impact of a potential decrease in physical activity on the general health of older people? Rapidly enforced isolation measures will most likely preclude baseline data collection. Retrospective studies and natural experiments using individual historical serial data, if available, or clinically and demographically matched, population-based data may serve as alternatives. (3) Are population-based and clinical physical activity interventions feasible, safe, and effective to counteract physical inactivity and to promote health benefits in older people during isolation? Clinical trials would be of paramount relevance, but potential barriers include restricted time for implementation, funding, staff, data collection, and follow-up, alongside difficulties in bringing participants to the laboratory for data collection. Observational and natural experiments may be practical and feasible alternatives. (4) What is the effect of physical (in)activity on immunosenescence and the underlying effect thereof on potential treatments, vaccines, and clinical outcomes of COVID-19? Answering this question will require orchestrated efforts between basic scientists, clinical and exercise immunologists, and epidemiologists. There is evidence that older individuals with higher age-adjusted cardiovascular fitness and regular physical activity show better vaccine responses, lower low-grade inflammation, and improved immune markers in various conditions, including cancer and cardiometabolic diseases. Whether this holds true for COVID-19 remains to be investigated.

In conclusion, the aggravation of physical inactivity emerges as a relevant "adverse effect" of the social isolation measures taken to combat the spread of COVID-19. A comprehensive body of literature suggests this has the potential of further deteriorating health in older individuals, contributing to sarcopenia, frailty, and cardiometabolic abnormalities, possibly leading to increased morbimortality. Efforts toward the development of public health actions, clinical interventions, and rigorous top-quality science on physical (in)activity due to imposed quarantine during COVID-19 are warranted.

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