## Letter to the Editor

# Exercise-based cardiac rehabilitation in COVID-19 times: one small step for health care systems, one giant leap for patients

## *Rehabilitación cardiaca basada en el ejercicio en tiempos de COVID-19: un pequeño paso para los sistemas de salud, un gran salto para los pacientes*

**To the Editor,**

In cardiovascular medicine, we treat patients at increased risk of developing severe disease and death if infected by COVID-19, with a mortality rate as high as 10%.[1] At the same time, patients are requiring timely treatments and morbidity and mortality will increase if we fail to provide them.

This dilemma is particularly disquieting with regard to exercise training in patients with cardiovascular disease,[2] because, unlike other cardiovascular treatments, the delivery of group-based, center-based cardiac rehabilitation requires the patient to travel to the hospital facilities multiple times a week for several months, which increases social contacts and consequently the risk of COVID-19 infection. At the same time, postacute myocardial infarction patients will experience a 20% to 30% increase in cardiovascular mortality and hospital admission if they miss exercise-based cardiac rehabilitation after hospital discharge.[3] The risk of hospitalization will increase by 40% in patients with heart failure with reduced ejection fraction if they are unable to undertake a cardiac rehabilitation program.[4]

In many countries, the uncontrolled spread of the COVID-19 has required a "do whatever it takes" response characterized by a strict social distancing policy leading to a wave of medical appointment cancellations, to the temporary deferral of nonurgent elective procedures, and to the full suspension of most of cardiac rehabilitation programs. Home confinement policies could be particularly prolonged for high-risk persons such as the elderly and those with cardiovascular diseases, especially if or when we face a second COVID-19 wave. These considerations will increase the challenge of weighing up the risks and benefits of holding back or carrying on with cardiac rehabilitation programs by physicians and their acceptability to patients.

Given the unpredictability of the upcoming months and years, we can expect major challenges in the delivery of traditional cardiac rehabilitation. Effective and sensible ways to deliver cardiac rehabilitation, while minimizing the risk of COVID-19 transmission, are urgently needed to guarantee the continuum of care for patients with cardiovascular disease.

One way to increase the availability and accessibility of cardiac rehabilitation services is to implement and scale up the supply of home-based programs. These programs include the same core components as center-based programs, but the interventions are delivered mostly or entirely at patients' homes.[5] Despite being provided outside of a medical facility without face-to-face observation, they are as safe, feasible, and effective as center-based programs.[5] The incorporation of telemedicine tools into home-based programs—such as videoconferencing software enabling a remote, real-time, supervised program at the patient's home—, could address the inherent disadvantages of lack of direct exercise supervision and socialization. In addition to direct health benefits by reducing hospital readmission and mortality rates,[5] telerehabilitation programs may also counteract the physical and mental consequences of social isolation.

In times of COVID-19, the benefits of telemedicine programs can extend beyond rehabilitation and stand as a useful prehabilitation intervention by enhancing patients' ability to resist a forthcoming stressor such as a COVID-19 infection. Prehabilitation encompasses several of the core components of cardiac rehabilitation such as exercise, nutrition, smoking cessation, and stress management.[6] Prehabilitation has been shown to improve physiological reserve prior to major surgery and consequently to enhance postsurgical recovery, reducing the postoperative complication rate and length of hospital stay, especially in high-risk populations.[6] Additionally, the intensity (moderate), type, and duration of exercise usually recommended in cardiac rehabilitation improves immune system regulation. This may positively impact the immunosenescence of elderly patients with cardiovascular disease,[7] which can theoretically increase their protection against the consequences of COVID-19.

The COVID-19 pandemic is challenging the way we provide cardiovascular care. Health care systems must redesign tools with flexibility and imagination, always within the boundaries of evidence-based medicine. Exercise-based cardiac rehabilitation programs are evidence-based treatments with relevant clinical benefits that should not be downplayed by our current focus on the pandemic issues. Combining home-based programs with the multitude of possibilities offered by widely available technological tools will allow us to provide the best solutions to patients and overcome the challenges of COVID-19.

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## REFERENCES


1. Wu Z, McGoogan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72314 Cases From the Chinese Center for Disease Control and Prevention. *JAMA.* 2020;323:1239–1242.
2. Ballesta-García I, Rubio Arias JÁ. Ramos Campo DJ, et al. High-intensity Interval Training Dosage for Heart Failure and Coronary Artery Disease Cardiac Rehabilitation. A Systematic Review and Meta-analysis. *Rev Esp Cardiol.* 2019;72:233–243.
3. Anderson L, Oldridge N, Thompson DR, et al. Exercise-Based Cardiac Rehabilitation for Coronary Heart Disease: Cochrane Systematic Review and Meta-Analysis. *J Am Coll Cardiol.* 2016;67:1–12.
4. Long L, Mordi IR, Bridges C, et al. Exercise-based cardiac rehabilitation for adults with heart failure. *Cochrane Database Syst Rev.* 2019. http://dx.doi.org/10.1002/14651858.CD003331.pub5.
5. Thomas RJ, Beatty AL, Beckie TM, et al. Home-Based Cardiac Rehabilitation: A Scientific Statement From the AACPR, the AHA, and the ACC. *Circulation.* 2019;140:e69–e89.
6. Scheede-Bergdahl C, Minnella EM, Carli F. Multi-modal prehabilitation: addressing the why, when, what, how, who and where next? *Anaesthesia.* 2019;74(Suppl 1):20–26.
7. Simpson RJ, Kunz H, Agha N, Graff R. Exercise and the Regulation of Immune Functions. *Prog Mol Biol Transl Sci.* 2015;135:355–380.