

*Exercise Physiology***Physically active routine during COVID-19 pandemic: do not fail to comply with the recommendations for cardiovascular health**Maycon Junior Ferreira¹ , Maria Cláudia Irigoyen² , Kátia De Angelis^{1,3} ¹*Universidade Federal de São Paulo, Departamento de Fisiologia, São Paulo, SP, Brasil;*²*Universidade de São Paulo, Faculdade de Medicina, Instituto do Coração (InCor), São Paulo, SP, Brasil;* ³*Universidade Nove de Julho, São Paulo, SP, Brasil.**Associate Editor: Angelina Zanesco. UNESP/Rio Claro, SP, Brasil.***Keywords:** physical activity; COVID-19; sedentarism; cardiovascular risk; prevention.**COVID-19 & cardiovascular disease: impact of sedentarism**

The rapidly-evolving outbreak of the new Coronavirus (SARS-CoV-2) worldwide, combined with its potential severity, led the World Health Organization (WHO) to characterize it as a pandemic, conducting several countries to adopt containment strategies to curb the pandemic, such as quarantine and stringent social distancing. In addition to essential preventive measures, public policies aimed at reducing cardiovascular (CV) risk factors will be required during and after this infectious scenario. In this context, cardiovascular prevention strategies will have to be strengthened, since they are crucial for the reduction of medium and long-term risk of CV mortality.

The health-damaging potential of the sedentary behavior pattern emerging from social confinement has posed another hurdle in the fight against the SARS-CoV-2, and its impact on the severity of the disease should not be neglected. It is widely known that sedentary behavior is associated with an increased risk of all-cause CV and cancer mortality¹. Since the beginning of the pandemic, a high prevalence of physical inactivity-associated comorbidities in COVID-19²⁻⁴, such as hypertension (HTN) and diabetes mellitus (DM) has been identified. Importantly, more severe forms of COVID-19 have been found in patients with these preexisting CV risk factors⁵, suggesting that such factors play a strong role in both individuals susceptible to infection and patients infected with SARS-CoV-2.

The psychological distress caused by quarantine has been widely reported⁶ and chronic stress may diminish the motivation to engage in any physical activity⁷. In addition, social isolation associated with feelings of loneliness leads to elevated CV risk⁸, and the risk of coronary heart disease and stroke due to a poor social relationship increase 32 e 29%, respectively⁹. Individuals often resort to excess caloric intake for stress relief, favoring weight gain, an important trigger for the development of comorbidities such as obesity and metabolic syndrome. Lower energy expenditure due to actual reduced mobility

may become a health issue and should be addressed as such. The SARS-CoV-2 pandemic exacerbated the vicious circle of stress-fatty junk food overconsumption that had been in place for decades, further worsening an obesogenic scenario by the abrupt reduction in physical activity levels.

Physically active lifestyle positively impacts cardiovascular health and COVID-19 complications

Both the practice of physical activity (understood as any motor activity that results in energy expenditure above resting levels) and exercise (systematized practice, carefully designed and prescribed, considering training variables and aiming at specific objectives) are of fundamental importance for this period of social distancing, particularly for the individuals with CV risk factors, which need closer and longer monitoring, due to their greater susceptibility to COVID-19 infection and complications. The current WHO guideline recommended at least 150-300 minutes of moderate-intensity throughout the week for adults and at least an average of 60 minutes per day of moderate- to vigorous-intensity across the week for children and adolescents¹⁰. However, even at levels lower than recommendations, physical activity may have a protective effect on COVID-19¹¹. Therefore, any body movement, according to one's routine, could play a beneficial role during and after the pandemic (Figure 1).

Many countries have already relaxed quarantine and social distance measures. However, both SARS-CoV-2 infection and some degree of social distance are predicted to last much longer. Given the uncertainties surrounding COVID-19 treatment and vaccine in the near future, addressing sedentary behavior and the associated-CV risks will remain a key health demand, requiring the immediate adoption of effective strategies to promote a physically active lifestyle during the pandemic. In recent decades, there has been a significant drop in CV diseases in several countries, fueled by the science-informed fostering of a healthy active lifestyle¹². The emergence of COVID-19

required confinement measures, however, may not only reverse this achievement but lead to a huge step back, as sedentary behavior in the context of the pandemic may further increase the risk of CV mortality. Thus, it is critical to encourage individuals to engage in physical activity, within their physical limitations, maintaining the use of prescribed medications, following medical recommendations, and seeking medical advice in the presence of any signs of discomfort when exercising.

Infected patients by SARS-CoV-2 requiring hospitalization may experience a dramatic reduction in cardiorespiratory fitness. Given the significant potential of cardiorespiratory fitness in abolishing CV risk related to sedentarism¹³, exercise-based telerehabilitation programs are highly desirable for this population and may favor a less traumatic and quicker recovery.

Final Remarks

The impact of COVID-19 could strongly affect economic, public, and health systems¹⁴. The maintenance of a physically active lifestyle as a preventive health strategy plays a key role in the fight against potential deleterious outcomes of COVID-19 and CV diseases. In face of the COVID-19 pandemic, for which treatment and vaccines are still in early development, the coming years will be indeed challenging. The negative behavioral changes induced by the virus should also be a reminder that sedentarism-associated CV diseases also cross borders and will not benefit from vaccines. However, the remedy may simply lie in a heightened awareness of the importance of physical exercise and the sustained engagement of health authorities and the population.

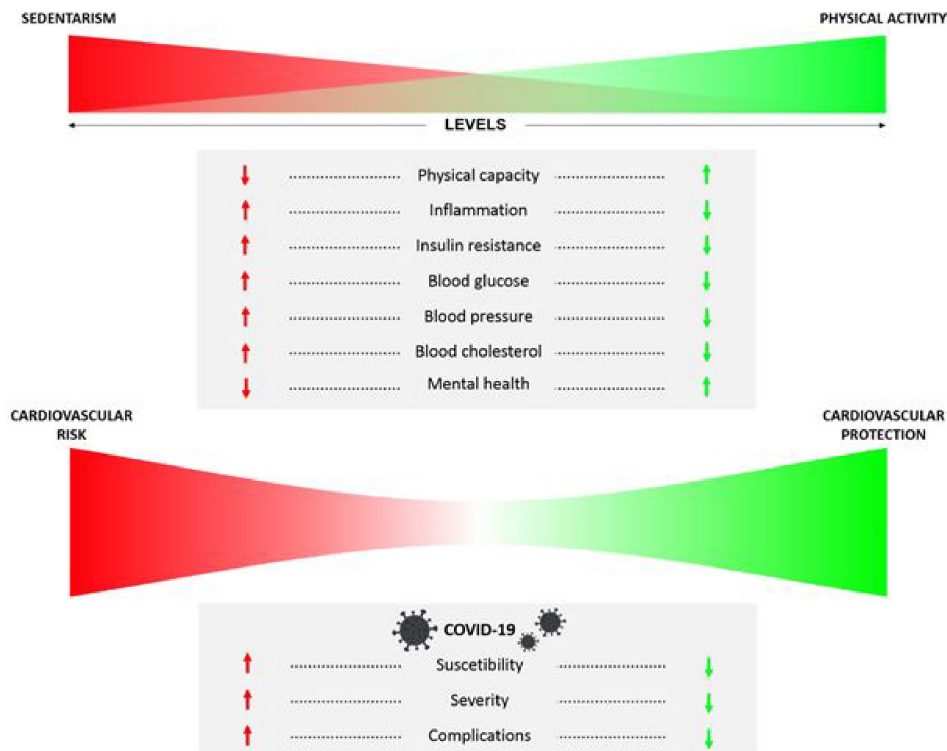


Figure 1 - The potential effects of sedentarism and physical activity during long-term on health parameters, and possible consequences of COVID-19 disease. High levels of sedentarism and low physical activity during long periods can trigger changes in physical, metabolic, cardiovascular and inflammation parameters, resulting in an elevated cardiovascular risk in the future, and predisposing individuals to a higher risk of SARS-CoV-2-associated disease, whereas the reduction in sedentarism and increased physical activity levels can to meliorating these components of health, reducing the cardiovascular risk and potentially improvement the protection against the COVID-19.

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