'Stay at home but don't stay still,' researchers recommend

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Brazilian researchers present scientific evidence on the impact of short periods of inactivity on the cardiovascular system and recommend exercise to stay fit at home during the pandemic. Credit: Marlene Abadias

The adverse side effects of the social isolation measures implemented to combat COVID-19 include an increase in sedentary behavior and physical inactivity, which can contribute to a deterioration in cardiovascular health even in the short term. Older people and people with chronic diseases tend to be most affected.

The warning comes from a review article published in the *American Journal of Physiology* by researchers at the University of São Paulo's Medical School (FM-USP) in Brazil. According to the authors, the slogan "Stay at home" broadcast by governments and chief medical officers is unquestionably valid under the present circumstances but should be coupled with another: "Don't stay still."

"You need at least 150 minutes of moderate to vigorous physical activity per week to be considered active by the World Health Organization [WHO] and medical associations. Gyms, fitness centers and sports facilities will be open to a limited extent in the months ahead, even after confinement and quarantine measures are lifted. Physical activity in the home is a worthwhile alternative," said Tiago Peçanha, first author of the article. Peçanha has a postdoctoral research scholarship from FAPESP.

The article reviews the scientific literature to compile evidence for the effects of short periods of physical inactivity on the cardiovascular system. Some of the studies cited show that between one and four weeks of bed rest can lead to cardiac atrophy and significant narrowing of peripheral blood vessels. Peçanha stressed that this is an aggressive model and does not reflect what happens during social confinement or

quarantine. "However, other experiments reviewed in the article are a good match," he said.

In one of these experiments, volunteers were asked to reduce their physical activity so that they took less than 5,000 steps in a week instead of more than 10,000 steps as usual. At the end of the period, the researchers observed a reduction in the diameter of the brachial artery (the main blood vessel in the arm), loss of blood vessel elasticity, and damage to the endothelium (the inner cell lining of all veins and arteries).

In other experiments, volunteers stayed seated for periods varying between three and six hours. This amount of inactivity was sufficient to cause vascular alterations, an increase in inflammation markers, and a rise in postprandial blood sugar.

"This first group of alterations observed in the studies have to do with functionality. In healthy volunteers, the heart and blood vessels function differently in response to inactivity," Peçanha said. "In an extended period of inactivity, the alterations tend to become structural and are harder to reverse."

Prolonged inactivity is particularly harmful for people with cardiovascular diseases and other chronic health problems, such as diabetes, hypertension, obesity or cancer. In older people, it can also aggravate loss of muscle mass (sarcopenia) and increase the risk of falls, fractures and other injuries. The FM-USP group recently published an article on this topic in the *Journal of the American Geriatrics Society*.

"These groups that are more vulnerable to the effects of inactivity are also high-risk groups for COVID-19 and will be staying at home for months. Ideally, they should find ways of staying active, such as doing housework, going up and down stairs, taking short walks, playing with

children, or dancing in the living room," Peçanha said. "The scientific evidence shows that getting exercise in the home is safe and effectively helps control blood pressure, reduces blood lipids, and improves body composition, quality of life and sleep."

For high-risk groups, especially people who are not habitually active, Peçanha recommends supervision by health professionals, which can be performed remotely using cameras, smartphone apps and other electronic devices. "Studies show that an online environment favoring social support and interaction tends to motivate people to keep fit," he said.

Fresh evidence

Data published in recent months by companies that sell smartwatches and exercise tracking apps suggest that the number of daily steps taken by users since the start of confinement has fallen.

"For example, Fitbit's blog presents data for 30 million users showing a 7%-38% decline in daily step counts during the week ending March 22," Peçanha said. "In Brazil, an internet survey by Raphael Ritti-Dias involving over 2,000 volunteers showed more than 60% saying they reduced their physical activity after the start of confinement or lockdown. All this evidence is preliminary, but studies are in progress to measure the effects on health of physical inactivity during social restrictions."

One of these studies is being conducted at FM-USP as part of the Thematic Project "Reducing sedentary time in clinical populations: the Take A Stand For Health Study". The principal investigator is Bruno Gualano, a co-author of the *American Journal of Physiology* article.

"We're working with clinical groups associated with the Thematic

Project, such as women with rheumatoid arthritis, patients submitted to bariatric surgery, and elderly subjects with mild cognitive impairment. They're encouraged to take more exercise in the form of daily activities such as walking the dog or getting off the bus two stops prior to their destination. The effects on their health are being studied," Peçanha said.

Since the implementation of social restrictions to contain the pandemic, the researchers have monitored a group of female rheumatoid arthritis patients more closely to measure their level of physical activity and compare it with the pre-pandemic level. "The patients are wearing accelerometers [electronic devices that measure physical activity and distance covered in a set period] at home," Peçanha said. "We call them frequently to ask about quality of life and diet. A few researchers visit them at home to measure body weight, body composition and blood pressure and to take blood samples."

Half of the volunteers will be encouraged to exercise at home. "We'll send daily targets, instructions and text messages. At the end, we'll compare the two groups and analyze the differences," he said.

More information: Tiago Peçanha et al, Social isolation during the COVID-19 pandemic can increase physical inactivity and the global burden of cardiovascular disease, *American Journal of Physiology-Heart and Circulatory Physiology* (2020). DOI: 10.1152/ajpheart.00268.2020

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