



## 2019 Novel Coronavirus: Emphasis on Maintaining Optimal Levels of Physical Activity Under Self-quarantine Conditions

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### Dear Editor,

The prevalence of coronavirus disease 2019 in China and subsequently in most countries of the world has become the most important health problem and has declared a state of emergency in many countries.<sup>1</sup> According to the WHO (April 10, 2020), positive cases have been observed in all countries of the world, and its prevalence is increasing sharply, as health systems in many countries have announced a pandemic situation. Finally, as of April 10, 2020, 66220 positive cases and 4110 deaths have been registered, making Iran one of the most infected countries in the world and having the highest number in the region.<sup>2</sup> Given the lack of available vaccines and essential remedies for the virus, numerous articles have been written on providing important scientific information on the virus. Key questions about the modes and mechanisms of transmission, incubation period, level of risk, and effective treatment are still under discussion.<sup>3</sup>

Due to the unprecedented outbreak and the state of emergency, many countries including Iran have adopted safeguards including near-total closing of the cities, flight cancellations, closing the schools for long time, and closing the public places such as sport clubs.<sup>4</sup> On the other hand, given China's successful experience in controlling the epidemic, measures such as self-quarantine are key to the prevention agenda. However, this disrupts the daily activities of millions of people worldwide, as well as in Iran.<sup>5</sup> It is well known that self-quarantine is naturally associated with reduced levels of daily physical activities.<sup>6</sup>

Staying home is accompanied by behaviors such as prolonged lying and sitting, watching TV, and using mobile phone. Concurrently, the likelihood of increasing

food and calorie intake in inactive conditions is inevitable. Consequently, a reduction in physical activity, and a decrease in resting energy expenditure accompanied by an increase in calorie intake, could increase the risks associated with sedentarism.<sup>6</sup> Hence, while long-term homestay is clearly recognized as an effective and safe preventive measure regarding the spread of virus, inactive lifestyle can lead to detrimental physiological changes including weight gain and metabolic diseases, as well as psychological changes including depression and aggression that may continue until after the end of the disease.<sup>5</sup>

Long-term inactivity, which is generally associated with excessive calorie intake, is the major contributor to overweight, followed by increased systemic inflammation.<sup>7</sup> In the current situation where fear of illness causes stress, the combination of stress, overeating, and increased inactivity can severely affect the immune system.<sup>5</sup>

In this regard, Dr. Woods, a pioneer in studies of the effects of exercise on the immune system, has shown that regular exercise exerts many anti-inflammatory effects on the body.<sup>8</sup> He has shown in his studies that exercise improves the immune response to the influenza vaccine. Moreover, in his numerous studies on animals and human subjects, he has displayed that endurance exercise has significant anti-inflammatory effects and strengthens the immune system.<sup>8,9</sup> Therefore, exercise seems to be safe during the coronavirus outbreak and offers many benefits to us.<sup>1</sup>

An important issue in the field of exercise in these conditions is the "exercise intensity". If an inactive person wants to start exercising, it is better to start with a low intensity and increase the intensity of the activity

over time, as it has been found that intense exercise can have a negative impact on the immunity system of the inactive person. However, if the active person decides to exercise and has already had regular exercise, he or she can continue the exercise at optimal intensity<sup>1</sup>. According to the research, even a single exercise can affect the immune system, but regular exercise has many more benefits, and cellular and molecular changes begin within seconds to minutes after exercise.<sup>10</sup>

Therefore, in quarantine conditions, continued physical activity and maintaining optimum levels of physical activity to prevent physical and mental disorders, as well as maintaining optimal immune function, is of the utmost importance, while avoiding this has irreparable consequences.<sup>11,12</sup>

Home-based exercise can be performed easily and safely that improves cardiopulmonary and immune function along with maintaining and improving fitness.<sup>11</sup> Balance exercises, stretching, range of motion, stepping, lifting, and moving up the stairs, chair dips, squats, pushups, and planks are examples of home-based exercises, though not limited to these<sup>13</sup>. Exercises like tai chi,<sup>14</sup> yoga,<sup>15</sup> dumbbell workout, elastic bands, and physioball exercises, as well as some pilates and aerobic exercises can also be performed easily in small space due to the lack of special equipment.<sup>13</sup> In addition to using sports videos,<sup>16</sup> mobile, and web sports software,<sup>17,18</sup> there are other effective ways to maintain physical function and mental health during the quarantine.

Therefore, the restrictions adopted to prevent the outbreak of the coronavirus epidemic should not limit physical activity or exercise, because exercise and physical activity keep people healthy and improve the health of patients with various diseases.<sup>1</sup> It is recommended that physically active people maintain an optimal level of activity and that sedentary people begin their physical activity and increase it over time. Furthermore, individuals staying at home during the coronavirus pandemic can perform 30 minutes of moderate-intensity or 20 minutes of high-intensity physical activities per day. Reducing sitting time and lying down is also highly recommended.<sup>5</sup>

Of course, specific groups such as children, the elderly, and people who have experienced the symptoms of the virus or are susceptible to the disease can also ask the advice of sports and health professionals.

Given the serious concerns about the increasing prevalence of coronavirus, preventive measures are strongly recommended. Self-quarantine is an important measure to prevent the spread of this infectious virus. Nonetheless, given that long-term quarantine may lead to more sedentary behaviors, increase the anxiety and depression, and lead to increased health risks, maintaining an optimal level of daily physical activity during the coronavirus pandemic is highly recommended.

## Conflict of Interest Disclosures

None.

## Ethical Approval

Not applicable.

## References

1. Zhu W. Should, and how can, exercise be done during a coronavirus outbreak? an interview with Dr. Jeffrey A. Woods. *J Sport Health Sci.* 2020;9(2):105-7. doi: 10.1016/j.jshs.2020.01.005.
2. World Health Organization (WHO). Novel Coronavirus (2019-nCoV): Situation Report—47. Available: [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200307-sitrep-81-covid-19.pdf?sfvrsn=27c364a4\\_2](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200307-sitrep-81-covid-19.pdf?sfvrsn=27c364a4_2).
3. Stoye E. China coronavirus: how many papers have been published? *Nature.* January 30, 2020. <https://www.nature.com/articles/d41586-020-00253-8>.
4. Xinhuanet. Xinhua Headlines: China Mobilizes Medical Teams to Fight New Coronavirus. Xinhuanet; 2020. Available: [http://www.xinhuanet.com/english/2020-01/24/c\\_138731835.htm](http://www.xinhuanet.com/english/2020-01/24/c_138731835.htm).
5. Chen P, Mao L, Nassis GP, Harmer P, Ainsworth BE, Li F. Coronavirus disease (COVID-19): the need to maintain regular physical activity while taking precautions. *J Sport Health Sci.* 2020;9(2):103-4. doi: 10.1016/j.jshs.2020.02.001.
6. Owen N, Sparling PB, Healy GN, Dunstan DW, Matthews CE. Sedentary behavior: emerging evidence for a new health risk. *Mayo Clin Proc.* 2010;85(12):1138-41. doi: 10.4065/mcp.2010.0444.
7. Quintanilha BJ, Reis BZ, Corrêa TAF, da Silva Duarte GB, Rogero MM. MicroRNAs and inflammation biomarkers in obesity. In: Faintuch J, Faintuch S, eds. *Precision Medicine for Investigators, Practitioners and Providers.* Academic Press; 2020. p. 179-85. doi: 10.1016/B978-0-12-819178-1.00017-4.
8. Woods JA, Keylock KT, Lowder T, Vieira VJ, Zerkovich W, Dumich S, et al. Cardiovascular exercise training extends influenza vaccine seroprotection in sedentary older adults: the immune function intervention trial. *J Am Geriatr Soc.* 2009;57(12):2183-91. doi: 10.1111/j.1532-5415.2009.02563.x.
9. Lowder T, Padgett DA, Woods JA. Moderate exercise protects mice from death due to influenza virus. *Brain Behav Immun.* 2005;19(5):377-80. doi: 10.1016/j.bbi.2005.04.002.
10. Dimitrov S, Hulteng E, Hong S. Inflammation and exercise: inhibition of monocytic intracellular TNF production by acute exercise via  $\beta(2)$ -adrenergic activation. *Brain Behav Immun.* 2017;61:60-8. doi: 10.1016/j.bbi.2016.12.017.
11. Nieman DC, Wentz LM. The compelling link between physical activity and the body's defense system. *J Sport Health Sci.* 2019;8(3):201-17. doi: 10.1016/j.jshs.2018.09.009.
12. Luan X, Tian X, Zhang H, Huang R, Li N, Chen P, et al. Exercise as a prescription for patients with various diseases. *J Sport Health Sci.* 2019;8(5):422-41. doi: 10.1016/j.jshs.2019.04.002.
13. Piercy KL, Troiano RP, Ballard RM, Carlson SA, Fulton JE, Galuska DA, et al. The physical activity guidelines for Americans. *JAMA.* 2018;320(19):2020-8. doi: 10.1001/jama.2018.14854.
14. Yang Y, Verkuilen J, Rosengren KS, Mariani RA, Reed M, Grubisich SA, et al. Effects of a Taiji and Qigong intervention

- on the antibody response to influenza vaccine in older adults. *Am J Chin Med.* 2007;35(4):597-607. doi: 10.1142/s0192415x07005090.
15. Falkenberg RI, Eising C, Peters ML. Yoga and immune system functioning: a systematic review of randomized controlled trials. *J Behav Med.* 2018;41(4):467-82. doi: 10.1007/s10865-018-9914-y.
  16. Tate DF, Lyons EJ, Valle CG. High-tech tools for exercise motivation: use and role of technologies such as the internet, mobile applications, social media, and video games. *Diabetes Spectr.* 2015;28(1):45-54. doi: 10.2337/diaspect.28.1.45.
  17. Haberlin C, O'Dwyer T, Mockler D, Moran J, O'Donnell DM, Broderick J. The use of eHealth to promote physical activity in cancer survivors: a systematic review. *Support Care Cancer.* 2018;26(10):3323-36. doi: 10.1007/s00520-018-4305-z.
  18. Norman GJ, Zabinski MF, Adams MA, Rosenberg DE, Yaroch AL, Atienza AA. A review of eHealth interventions for physical activity and dietary behavior change. *Am J Prev Med.* 2007;33(4):336-45. doi: 10.1016/j.amepre.2007.05.007.