



Covid-19: high rates of severity and death in elderly and patients with chronic diseases reinforces the importance of regular physical activity

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Coronavirus disease 2019 (Covid-19) caused by Coronavirus 2 (SARS-CoV-2) has been emerging exponentially worldwide with approximately 8,261,260 confirmed cases and 445,468 deaths up to Jun 17, 2020 [1]. Although in most cases the Covid-19 symptoms are mild, the SARS-CoV-2 is transmitted easily and quickly and can overwhelm health systems [2]. Current evidence indicated that at least 15% of Covid-19 patients develop severe symptoms and need intensive care [3–5]. Noticeably, age is a factor that contributes to severe outcomes [6] and the presence of chronic diseases (CDs), in patients at any age, seems to contribute to severity and death [5]. An Italian report has described the characteristics of Covid-19 associated deaths, showing that the mean age was 78.5 and the most common pre-existing comorbidities were hypertension and diabetes [5]. Furthermore, according to data from the China outbreak, hypertension and diabetes were more prevalent in Covid-19 patients with severe (23.6 and 16.8%, respectively) compared to those with nonsevere (13.3 and 5.7%) symptoms [3].

It is well accepted that increases in visceral adipose tissue lead to metabolic alterations and chronic inflammation, increasing the risk for CDs [7]. These disturbers also negatively impact immunity from infection, vaccine efficacy [8], and may contribute to the severity of Covid-19 since evidence suggests that a subgroup of those patients have a cytokine storm syndrome (i.e. hyperinflammation) [9]. Indeed, it has been demonstrated that obesity is a risk factor

for Covid-19 intensive care admission in patients younger than 60 years in the United States [10]. A French study also showed that the risk for invasive mechanical ventilation among Covid-19 patients was 7.36 higher for those with body mass index (BMI) > 35 kg/m² compared to patients with BMI < 25 kg/m² [11].

No vaccines or specific drugs have been developed for Covid-19 to date. Furthermore, even countries that have adopted social isolation policies to mitigate or suppress the transmission may have a second wave of SARS-CoV-2 contamination [2]. Beyond social isolation, can behavioral interventions help to reduce Covid-19 morbidity and mortality? We believe that alterations of the contemporary lifestyle, that includes sedentarism, unhealthy food intake, and stress [7], would help to prevent severe outcomes in infected people. For instance, regular physical activity (PA) has been associated with benefits to the immune system in different populations [12, 13]. Regular PA seems to attenuate the immune disturbers related to age (i.e. immunosenescence), particularly preventing T cell remodelling. It reduces the risk of infections and improves the control of latent viral infection [12]. Higher PA levels also induce enhancements in the metabolism and the cardiovascular system in healthy individuals and people with CDs [14]. PA may induce short-term immune adaptations and it has been attributed to an anti-inflammatory effect by the visceral fat mass reduction and/or the induction of an anti-inflammatory environment [13].

It has been recommended that active people should maintain PA as part of their routine during the Covid-19 pandemic [15]. Nevertheless, it is still unclear whether the same applies to sedentary, elderly, and people with CDs. Studies have shown that excessive PA amount or intensity induces lymphocytosis during and immediately after exercise [13]. This may lead to a transitory immune depression, although the lymphocytes levels return to basal within 24 h [13]. On the other hand, short moderate-intensity activities seem to

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do not promote significant acute immune depression [13]. Thus, it seems to be safe to incorporate regular moderate doses of PA as part of the routine. The American College of Sports Medicine recommends ≥ 30 min of moderate PA on ≥ 5 days/week. However, performing ≥ 30 min of PA all at once could be exhausting for people with very low PA levels [14]. For this reason, breaking up the total time throughout the day should be considered [14]. The guidelines suggest that moderate exercise should be performed between 64–76% of maximal heart rate and/between 12–13 on the 6–20 rating of perceived exertion Borg's Scale [14]. Importantly, in addition to immune and cardiometabolic positive effects, regular PA may protect against psychological distress [16] that has been described in different populations during the Covid-19 pandemic [17].

The Covid-19 outbreak is causing a very deleterious impact on the health and economic systems worldwide. Thus, we strongly suggest the development of studies to evaluate the impact of PA levels and other lifestyle factors on the severity and deaths in patients with Covid-19. We are aware that a healthy lifestyle, including PA, will not be the solution for the pandemic, nevertheless, it can be a valuable adjuvant acting as following. First, improving immunity, especially in elderly people, and the clinical condition of patients with CDs. Second, increasing the Covid-19 vaccine efficacy when it is available. Third, enhancing mental health. Taken together, the PA outcomes might also promote indirect effects such as less overwhelming of health systems by decreasing the number of severe cases, which also would result in significant economic benefits.

Compliance with ethical standards

Conflict of interest No conflict of interest is declared by the author(s).

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