

PERSPECTIVE

COVID-19, physical (in-)activity, and dementia prevention

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Abstract

Physical inactivity is one major modifiable risk factor for dementia (especially Alzheimer's disease). Due to contact restrictions and isolation measures in response to the current COVID-19 (coronavirus disease 2019) pandemic, physical inactivity levels have increased by up to 30%, which will likely have adverse consequences for primary and secondary dementia prevention. Therefore, new interdisciplinary prevention approaches (eg, outdoor exercise; app-based exercise with online partners) are urgently needed that account for the suspected long-term lifestyle changes that the current—and upcoming—pandemics are likely to entail (increased use of home office, social isolation, avoidance of fitness centers and club sports, and so on).

1 | INTRODUCTION

In December 2019, an outbreak of pneumonia caused by a novel coronavirus (severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]) occurred in Wuhan, China, and it has spread rapidly worldwide.¹ Coronavirus disease 19 (COVID-19) is caused by SARS-CoV-2, which, like MERS-CoV (Middle East respiratory syndrome coronavirus) and SARS-CoV (severe acute respiratory syndrome coronavirus), is a member of the genus Betacoronavirus.¹ The viral agents cause a respiratory infection with clinical symptoms of viral pneumonia and ARDS (acute respiratory distress syndrome) in some patients.² However, in addition to respiratory symptoms, COVID-19 can cause inflammatory-associated multiorgan damage, coagulation abnormalities, acute kidney injury, acute heart failure, and rhabdomyolysis.² Furthermore,

COVID-19 is associated with several neurological manifestations, including stroke, headache, and impaired consciousness.³

Until the beginning of August 2020, a total of over 18 million infected patients (including over 700,000 deaths) were reported by the World Health Organization (WHO). In addition to the challenge of the COVID-19 pandemic for the health care system, the current situation revealed numerous effects on physical (in-)activity levels and thus on approaches for dementia prevention.

1.1 | Physical (in-)activity and dementia prevention

Physical inactivity is a modifiable risk factor for dementia, especially vascular dementia and Alzheimer's disease (AD). Along with other

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modifiable risk factors (eg, smoking, midlife hypertension, midlife obesity, and diabetes) physical inactivity is assumed to account for one third of the global prevalence of AD.⁴ In contrast, physical activity and/or exercise is a low-cost intervention in primary and secondary prevention for dementia.⁵⁻⁷ Hamer and Chida (2009) have shown in a meta-analysis, including 16 prospective studies with 163,797 non-demented participants, that physical activity is associated with a reduced risk of dementia of all types of 26% and a reduced AD risk of 45%.⁸

Often physical activity and exercise are used synonymously, which can be misleading. "Physical activity" is defined as any muscle-induced bodily movement that increases energy expenditure above $\approx 1.0/1.5$ metabolic equivalent of task (MET, 1 MET = 1 kcal (4184 kJ) \times kg⁻¹ \times h⁻¹) whereby "physical exercise" is a specific, planned, and structured form of physical activities.⁹

A variety of recommendations exist regarding the minimum of physical activity required for a positive health effect. Currently WHO recommends a minimum of 150-minute moderate-intensity or 75 minute vigorous-intensity aerobic activity and strength training per week.¹⁰ Already before the current COVID-19 pandemic, a global analysis reported the prevalence of insufficient physical activity at 27.5%.¹¹ The highest physical inactivity levels were found in women in Latin America and the Caribbean (>40%) and in both men and women in high-income developed countries (>40%). The high prevalence of physical inactivity and its detrimental effect on major non-communicable diseases presents a major public health problem.

1.2 | COVID-19 and physical (in-)activity

Because of home confinement and social isolation during the COVID-19 pandemic, physical activities were found to be reduced.^{12,13} Preliminary results from a global questionnaire indicate that physical activity levels decreased by over 20% and that the daily sitting time increased by more than 28% during the COVID-19 pandemic.¹⁴ A cross-sectional online survey reported a physical activity level decrease of 26.5% in older community dwellers in Japan.¹³ In addition, Tison et al. reported a global decrease of daily steps (mean 27.3% within 30 days following the declaration of a pandemic) with large regional differences.¹⁵ Furthermore, a recent report by Fitbit Inc. indicates a physical activity level decrease (determined by number of steps in over 30 million people in Europe) between 7% and 38% (<https://blog.fitbit.com/covid-19-global-activity/>).

1.3 | COVID-19, physical (in-)activity, and dementia prevention

Because of the effects of the COVID-19 pandemic on physical activity levels, new interdisciplinary prevention approaches are urgently needed that take the lifestyle changes induced by the pandemic into account. An active lifestyle (including physical and social activity) is an important modifiable factor for brain health across the

lifespan and dementia prevention. In this context we recommend emphatic physical activity and social interactions (under consideration of current restrictions) to counteract the negative effects of the COVID-19 pandemic. Since physical exercise has been shown to exert anti-inflammatory effects, too, it may also have potential against viral diseases like COVID-19.¹⁶

In the absence of a specific investigation on the value of enhanced physical activity during the quarantine, together with a difficult to predict further development of the COVID-19 pandemic, physical activity and exercise recommendations need a revision. We recommend home-based workouts (including endurance, resistance, and balance exercises; app-based exercise training with online partners) and outdoor activities.¹⁷⁻¹⁹

Future research is needed to investigate the impact of the COVID-19 pandemic on physical activity and dementia prevention in more detail. Particularly, the long-term consequences should be central for future research. It can be assumed that the negative consequences of the COVID-19 pandemic on physical activity and social interaction will also have negative consequences for dementia risk.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

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