

COVID-19 quarantine: Two-way interaction between physical activity and mental health

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Abstract

Recent studies have revealed that physical activity significantly reduces the risk of coronavirus disease 2019 (COVID-19) infection by strengthening the immune system. Also, regular physical activity can reduce the risks of developing physical and mental health problems such as diabetes, hypertension, coronary heart disease, stress, anxiety, depression, etc. However, the two-way interaction between physical activity and psychological symptoms has not been well addressed yet. This paper is intended to examine various dimensions of this interaction and its effects on mental health at the time of COVID-19 quarantine.

Key Words: COVID-19, mental health, physical activity.

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Coronavirus disease 2019 (COVID-19) outbreak was first reported in late December 2019 in Wuhan, China.^{1,2} It was recognized by the World Health Organization (WHO) in January 2020 as a Public Health Emergency of International Concern. The rapid spread of the COVID-19 to other countries worldwide prompted the WHO to announce this crisis as a global pandemic in March 2020.³ Soon or later, countries implemented early containment strategies, such as: i) home isolation for those in 'high-risk' groups (e.g., ≥ 70 years old); ii) 14-day self-isolation for people who were suspected or confirmed to have COVID-19 infection; iii) keeping 2 meters physical distance from one another; iv) closures of schools and childcare providers; v) closures of services and amenities (bars, pubs, restaurants, gyms, pools, etc.) and vi) implementing dedicated hospital services, i.e., COVID-19 diagnostics,⁴⁻⁹ clinics and intensive care units to stop the virus from spreading through the population and minimizing the burden of COVID-19 crisis on population and on national healthcare systems.¹⁰ Although these measures have been associated with a reduced transmission chain of COVID-19, they have highly overshadowed the physical and mental health of individuals.^{11,12} Nevertheless, the impacts of obliged pandemic-related behavioral changes on these aspects of people lives have not been well discussed. Only a few recent reports demonstrated that strategies to reduce spreading COVID-19 affect levels of physical activity¹³⁻¹⁵ and psychological symptoms.^{11,15,16} In detail, during quarantine time, physical activity levels appear to

decrease while the amount of time spent in sedentary behaviors potentially increases due to limited opportunities for activity.¹⁷ Besides, the recent COVID-19 disaster has posed major challenges for maintaining people's mental health.¹⁸ As a result, both people with or without a history of mental illness may experience high levels of distress and double pressure at the time of the COVID-19 pandemic, particularly in isolation.¹⁹ For instance, a 2020 rapid review indicated that quarantine causes acute negative psychological effects with potentially long-term consequences.²⁰ Several recent studies on adults in all parts of the world have revealed high levels of depressive and anxiety symptoms, probably associated with the COVID-19 pandemic.¹¹ Since current empirical evidence suggested positive benefits of regular physical activity and physical exercise to mental health outcomes of COVID-19 quarantine, a sedentary lifestyle may serve to complicate an already-problematic situation.^{17,21-24} In other words, exercise is a control mechanism for many mentally ill people and a protective factor for those without any psychological disorders.¹⁹ Some of the positive effects of regular physical activity on psychological health include: (i) improving one's self-esteem and a sense of well-being; (ii) reduction of stress, anxiety, and depression by making changes in the hypothalamic-pituitary-adrenal axis and mediation of the endogenous opioid system; and (iii) upregulation of different trophic factors, such as brain-derived neurotrophic factor.²² A recent study has recommended that the time required for exercising

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Table 1. Summaries of psychological techniques for increasing physical activity during quarantine time (adapted from Diamond & Waite, 2020)²³

Beliefs about activity	
Identification of cognitive biases	Cognitive biases are systematic errors in thinking that may occur during the processing and interpretation of surrounding events and affect people's decisions and judgments.
Cognitive restructuring	Cognitive reconstruction is a psychotherapeutic technique of learning to identify and cope with maladaptive and irrational thoughts, called cognitive distortions.
Socratic dialogue	This technique, known by various names such as Socratic questioning, Socratic method, and Maieutic method, is one of the methods used by psychologists in exploring the mind to help people discover new aspects of thinking about self and the world.
Behavioral experiments	Behavioral experiments are planned experiential activities to test the validity of individuals' beliefs about self, others, and the world, or to test new and more adaptive beliefs.
Savoring	Savoring comprises the special focusing on pleasurable aspects before, during, or after an activity. Psychotherapists can use these techniques to evoke this memory in mind and generate motivation before repeating the activity.
Imagery	Creating an image of task completion can increase the involvement likelihood by reducing the power of unhelpful images and building self-confidence.
Motivation for activity	
Goal-setting	Goal-setting is the act of selecting a specific, realistic, and time-based target that one wishes to achieve. Recent studies have proposed that performance goals (e.g., achieving 10,000 steps per day) are probably less helpful to those starting an activity compared to the goals directed toward learning new strategies (e.g., finding four ways to increase step count during the week).
Mental contrasting	Mental contrasting is a self-regulatory strategy that contributes to the commitment to the goal. For instance, "Although I am not allowed to leave the house, I still exercise by watching online sports videos".
Motivational interviewing	Motivational interviewing is a client-centered counseling style to extract behavior change by helping the client discover and resolve ambivalence. This is especially important given the additional barriers imposed by the pandemic, including limited access to facilities and group activities.
Imagining a different future	In this method, clients are asked to imagine that they are able to live without current obstacles following a miracle.
Psychoeducation	Psychoeducation about the beneficial effects of exercise on psychological symptoms can help increase physical activity during the quarantine period.
The sense of reward obtained from the activity	
Behavioral interventions	Psychologists can use step-by-step planning to help people choose the right amount of activity for themselves and explore ways to ensure that the experience is rewarding and not aversive.
Problem-solving	This method involves producing several possible solutions alongside their advantages and disadvantages, which can facilitate the selection and testing of a solution and eliminate the feeling of being trapped in the deadlock. Identifying innovative ways to work out at home, such as accessing online sports classes, or learning how to keep distancing while exercising outdoors, are examples that can be resolved using this method.

during the quarantine would be at least 30 minutes of moderate-intensity or 20 minutes of vigorous-intensity aerobic exercise training every day.²⁵

Although the effects of exercise on mental health can be enhanced by increasing its intensity, the intensity and volume of exercise should be adjusted and controlled separately for each person using professional counseling, for the sake of stimulus effectiveness.²⁶ Reciprocally, psychological barriers have long been realized as significantly important and decisive factors to prevent activity, especially among people with mental health problems. Additionally, during a pandemic, there may be additional barriers to increased activity, such as anxiety about leaving home, the closure of gym facilities, and less chance of group exercise.²³ Psychologically, three cognitive factors may be involved in an activity: (i) beliefs about the activity; (ii) motivation for the activity; and (iii) the sense of reward obtained from the activity. According to psychological theory, this complex set of considerations can be used in a meaningful psychological approach through an individualized formulation.²³

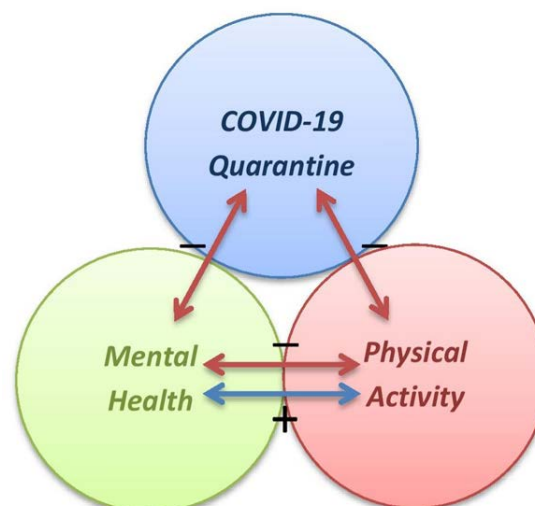


Fig 1. Interactions between COVID-19 quarantine, physical activity, and mental health

For example, as regards beliefs about physical activity, Beck's cognitive model describes how people's beliefs about the self, others, and the world may inhibit physical activity and are thus a key target in activity-enhancing interventions.²⁷ Also, as to motivation, psychoeducation can increase people's awareness of the beneficial effects of physical activity on mood and anxiety, and encourage them to make lifestyle changes.²⁸ Table 1 summarizes other psychological techniques in this area.^{23,29,30}

In conclusion, given the two-way interaction between physical activity and psychological symptoms (Figure 1), clinicians should assume them as a treatable clinical goal, depending on the circumstances. Moreover, due to the different benefits that physical activity provides to people's mental health, in any legal statement issued by government agencies, physical training, both indoors and outdoors, should be considered an essential application during the COVID-19 periods of isolation and quarantine.

List of acronyms

COVID-19 - Coronavirus disease 2019

WHO - World Health Organization

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