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The importance of promoting physical activity during the COVID-19 outbreak to control the worsening of old pandemics

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HIGHLIGHTS

- The measurements to contain COVID-19 are changing the daily living activities in the general population.
- A combination of a past and present pandemics can be dangerous, and new strategies are necessary.
- Physical activity is one of the most important non-pharmacological therapies for health promotion, and for prevention and management of diseases.
- There is an urgent need in changing the face-to-face prescription, management, and evaluation of exercise to remote tools.
- The transitions from center-based to home-based training are welcome to control the worsening of old pandemics.

ABBREVIATIONS

COVID-19	Coronavirus disease 2019
FITT	Frequency, intensity, time, and type
NCDs	Non-communicable chronic diseases
PD	Parkinson's disease
SARS-CoV-2	Severe acute respiratory syndrome coronavirus 2
WHO	World Health Organization

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ABSTRACT: The pandemic of coronavirus disease 2019 (COVID-19) is an unprecedented public health emergency of global concern. Although the measures to contain the COVID-19 spreading is essential, there are old pandemics that we are still fighting and cannot be neglected during the current outbreak. Non communicable chronic diseases (NCDs) remain the leading cause of death worldwide. Indeed, physical inactivity is one of the most important risk factors for NCDs and it was considered a pandemic matter in 2012. Therefore, we discuss new strategies (i.e., transition from center-based to home-based training) to increase motivation, participation, and adherence in physical activity during the COVID-19 to control the worsening of old pandemics.

KEYWORDS: COVID-19 | Non-communicable chronic diseases | Physical activity | Home-based training

INTRODUCTION

The COVID-19 is an emergency that is responsible for 150.814.990 million infections and 3.171.266 deaths worldwide.[1] The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been shown to affect most individuals with non-communicable chronic diseases (NCDs) resulting in poorer outcomes and higher mortality.[2] NCDs has been considered a global health issue by the World Health Organization (WHO) for the last 15 years.[3] NCDs represented US$ 84 billion of costs in low-and-middle-income countries whereas it was accountable for 50% of the disease's total burden.[3] Indeed, although the measures to contain COVID-19 spreading are urgent

and welcome, there are old pandemics that we are still fighting and cannot be neglected during the current outbreak.

Physical inactivity is highly related to NCDs and it was considered a pandemic matter in 2012.[4] In 2013, it was responsible for US$ 13.7 billion in productivity losses and 13.4 million disability-adjusted life-years worldwide.[5] Therefore, many international and national organizations were "called to action" to advance global health through physical activity.[6] Public strategies aimed to reduce at least 10% of physical inactivity until 2025.[7] However, the prevalence of insufficient levels of physical activity has been increasing in low-income countries during the last years.[5] Therefore, it may not be possible to reach this goal in the upcoming five years.[8]

Furthermore, the measurements due to the COVID-19 (i.e., lockdown, quarantine, and social isolation) are changing the daily living activities of worldwide population.[9] Preliminary evidence suggests a decrease in physical activity levels and a rise in sedentary behavior, which may substantially increase the burden of NCDs.[10] Nevertheless, aging population is an increasingly worldwide phenomenon, and the age-related effects have been demonstrating to affect motor performance (i.e., slowing of movement) and cognitive deficits (i.e., working memory) in older individuals. These declines in fine motor control, gait, and balance affect the ability of older adults to perform activities of daily living and thus maintain their independence.[11] In addition, the perception of social isolation (i.e., loneliness) is also a psychological risk factor for mortality and morbidity.[12] It has been demonstrated that loneliness and social isolation are strongly associated with cardiovascular conditions such as hypertension and atherosclerosis. Indeed, this continuous social stress can influence cognitive function, depression, overactivation of the sympathetic nervous system, and disturb neuroendocrine mechanisms.[13] Thus, a combination of the current pandemic and a lockdown environment can be dangerous and strategies to improve physical and mental health are urgently required.

Physical activity is one of the most important non-pharmacological therapies in health promotion, prevention, and management of diseases.[6] The numerous benefits in health-related and psychosocial variables are well established.[6,14] The chronic benefits of the regular practice of physical activity are constructed by single sessions of exercise. For example, in neurodegenerative diseases, one single session of a high- and moderate-intensity aerobic exercise has demonstrated to promote better cognitive performance in people with Parkinson's disease (PD).[15] However, regarding to chronic effects, 12 weeks of high-intensity interval exercise were superior to moderate-intensity continuous exercise in improving the six-minute walking test and endothelial function in PD.[16] In cardiovascular diseases, aerobic exercises can acutely reduce systolic/diastolic blood pressure nearly by 8/9mmHg, respectively.[17] In the long-term, a reduction of 36/12 mmHg in systolic/diastolic blood pressure can be observed.[18] In fact, only a small reduction of 5mmHg in systolic blood pressure decreases the risk of stroke by 14%, coronary heart disease by 9%, and all-cause mortality by 7%.[19] Hence, the benefits of exercise initiate with short steps in different diseases and it should be emphasized to increase the individuals' participation, motivation, and adherence to physical activity.

The main recommendations for physical activity are based on the frequency, intensity, time, and type (FITT) of at least 150 min (30 min, 5 d/wk) of moderate-intensity exercise (40-60%VO2MAX) or 75 min (25 min, 3 d/wk) of high-intensity exercise (60-85% ofVO2MAX) per week, in association with 2 to 3 sessions per week of resistance

exercise.[14] Flexibility and balance training are also recommended (2-3 d/wk), mostly for older individuals.[6] However, the implementation of the physical activity guidelines' recommendations in the general population is challenging. The main barriers correlated with adult's participation in physical activity are concerning the influence of marital status, obesity, smoking, lack of time, past exercise behavior, and environmental variables.[20] Hence, access to facilities, neighborhood safety, and access to exercise equipment at home can be important factors for increasing participation and supporting behavioral change.[20,21]

In recent years, home-based exercise training has been investigated as an alternative to center-based training programs (i.e., gym, parks, clubs), and has been shown to be an effective tool for improving cardiometabolic and psychosocial variables, with no adverse events being reported.[21,22] In addition, it may aid patients in developing self-management skills for improving and maintaining their physical fitness levels.[23] However, the benefits of home-based exercise training for high-risk individuals (i.e., cardiovascular disease) is still not adequately elucidated in the literature and future studies are needed. Moreover, with the first wave of COVID-19, there was an urgent need to change the face-to-face prescription, management, and evaluation of exercise to remote tools (i.e., apps, videos, games, and other technologies).[21,24] With the second wave of the COVID-19 in different countries, essential transitions from center-based to home-based were welcomed to be developed and implemented focusing on new alternatives, and thus increasing motivation, participation, and adherence to physical activity for controlling the worsening of old pandemics (i.e., physical inactivity).

A recent review demonstrated the usefulness and safety of home-based exercise training including aerobic, resistance, or combined exercise programs in individuals with diabetes.[24] Various tools such as heart rate monitors, pedometers, portable oximeters, questionnaires, diaries, or scales were suggested to control the intensity and duration of exercise.[24] In addition, the use of equipment such as cycle ergometer, home rowing ergometer, stairs, chair, rice bags, and bottles of water were mentioned as practical strategies to implement an adequate exercise program.[24] It is important to note that regular phone calls, video conferences, reevaluations, visits, cellphone messages, apps advice, emails, or internet devices are considered important to maintain the development and the regular feedback.[21,24] A first orientation session with explanations about an exercise program and self-management education (i.e., call to the emergency in case of an event or injury) is relevant during a well-guided home-based exercise program.[22] Yet, a multidisciplinary team is important in the management and security of these programs.

The main advantages of home-based exercise training are expanded access, individual programs, flexible scheduling, privacy, integration with regular home routines, and members of the family.[21] Moreover, home-based exercise training has been associated with higher satisfaction and appears to be more cost-effective than center-based training.[23] Thus, it should be considered as a fixed option within exercise programs, based on the preference, sociodemographic conditions, and clinical status of each participant. Nonetheless, the latest WHO guidelines of physical activity and sedentary behavior emphasize that "doing some physical activity is better than doing none" and "every movement count" for all populations.[25] In this context, small actions in daily living, such as interrupting prolonged sitting every 30 min[26] or regular intermittent bouts of vigorous-intensity incidental physical activity (i.e., carrying shopping bags, walking uphill,

and stair climbing) are beneficial for health and should be encouraged in lifestyle behavior during and beyond home-based exercise training.[27]

Finally, while many international strategies are being developed to contain the COVID-19,[1] it is still necessary to combat old pandemics as the burden of NCDs and physical inactivity. Despite the lack of studies assessing the health impact during the COVID-19, physical inactivity can have an important impact, including an increase in the global burden of NCDs. Therefore, increasing participation, adherence, and maintaining the levels of physical activity will provide long-term physical, motor, and psychosocial benefits. Indeed, the transition from center-based to home-based exercise programs may be a useful and safe strategy during and beyond the COVID-19 outbreak, and future studies to elucidate these benefits in the general population are welcome. In conclusion, physical activity should be considered as the key to the past, present, and future which have important public health implications.

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