



# Mental health of older people in social isolation: the role of physical activity at home during the COVID-19 pandemic

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## Abstract

The COVID-19 pandemic involves a new coronavirus characterized by a respiratory disease resulting from an infection with severe acute respiratory syndrome by coronavirus 2 (SARS-CoV-2). The severity and fatality of COVID-19 are directly related to age and immunocompromised states, with older adults making up the vast majority of cases. The elderly with a higher risk of serious complications due to COVID-19 and deaths are also the group most susceptible to the damage of social isolation, impacting on mental health, resulting in a more sedentary lifestyle, and health problems due to several causes, implying need for greater attention, care and protection. Physical activity has shown excellent results for mental health, being used in different treatments and populations, when considering the elderly, one of the ways to mitigate this impact on mental health is the practice of physical activity. Here, we discuss the impacts of social isolation on mental health and the role of physical activity and exercise in the homes of the elderly as a way to protect the spread of other diseases from all causes during the COVID-19 pandemic period. To this end, we discuss some possibilities that can be used by the elderly in the period of social isolation, to the point of remaining active within their homes.

**Keywords** SARS-CoV-2 · Exercise · Sedentary behavior · Public health · Aged · Frail elderly

The COVID-19 pandemic involves a novel coronavirus characterized by a respiratory illness that results from a severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. This has caused an unprecedented lockdown worldwide, due to social isolation of the population, aiming to prevent the spread of the disease [1]. As of 02 August 2021, 198,425,839 COVID-19 cases were confirmed, including more than 4,227,258 deaths [2]. To date, the US has reported the most cases (35,004,592 cases), followed by India (31,695,958), Brazil (19,938,358) and Russia (6,230,482) [2]. In addition, new waves and outbreaks of COVID-19 caused by new SARS-CoV-2 variants have raised alarming concern about the possibility of reinfection, which will force further measures and lockdowns [3–5]. On other hand, there are 4.139.616.359 vaccine doses administered [2].

The severity and fatality of COVID-19 have been directly related to age and immune-compromised states, with older adults making up the vast majority of cases (> 80%) [6]. The data from countries, such as Italy and China reveal higher mortality rates among older people aged over 60 as compared to other age groups [7]. In this sense, the World Health Organization (2020) [8], has defined vulnerable groups as those aged over 60 years and recommended strict isolation of the geriatric population, this being one of the strategies adopted to flatten the COVID-19 curve in practically the entire world [9].

Although there have been advances in the rapid and safe production of vaccines, such as Oxford—AstraZeneca (ChAdOx1/AXD1222), Moderna (mRNA-1273), Pfizer (BNT162b1 and BNT162b2), Sinovac Biotech (CoronaVac) and Academy of Military Medical Sciences (Sputnik V) [10], physical social distancing is still effective during the period when the population of each country is being vaccinated, since it hinders the spread of the infection and reduces the exponential growth of the virus, especially of the new variants (e.g., from Brazil, South Africa and the UK), thus preventing the collapse of health systems and saving

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countless lives. However, older adults with a higher risk of serious complications from COVID-19 and deaths are also the group most susceptible to the damages of social isolation [11], which can result in a more sedentary lifestyle and health problems due to different causes, implying the need for greater attention, care and protection.

Social distancing can impact the mental health of older adults, which is an independent risk factor for depression, anxiety disorders, suicide and worsening of existing psychiatric symptoms, further impairing the daily functioning and cognition of this population, in addition to increasing feelings of fragility, loneliness, stress and irritation [12]. Evidence supports a negative impact of quarantine on psychological health, including post-traumatic stress symptoms, confusion and anger [13, 14] requiring attention and monitoring.

Several health behaviours have changed during the COVID-19 pandemic, including physical activity, alcohol consumption, dietary behaviours and sleep, which can negatively impact mental health [15]. Before the pandemic, the global concern with mental health was already expressive. Compared to an estimated global prevalence of depression of 3.44% in 2017, there was a seven-fold increase during the initial COVID-19 outbreak in the period between January and May 2020 [16]. The results of a recent meta-analysis revealed a prevalence of depression of 22% in the general population [17]. In the 14 studies reviewed with a sample of 44,531 people, the prevalence of depression was 33.7% [18]. Although the studies present data from the general population, an important point should be made considering the elderly population, since clinically stable older people may be affected by a psychiatric disorder. The recent data reveal great concern, the prevalence of depressive and anxious symptoms was found to be 62.3% in clinically stable elderly people, suggesting a great impact of the outbreak of COVID-19 on the mental health of these individuals [19].

The direct economic impact of mental disorders is impressive. Global economic costs were estimated at \$2.5 trillion in 2010 and are expected to double by 2030 [20]. Although the pandemic has now overcome all other diseases in terms of costs, it will almost certainly leave an indirect burden higher than previously calculated estimates.

Physical activity has shown great results for mental health, used in different treatments and populations. When we consider older people, one of the ways to mitigate this impact on mental health is the practice of physical activity, included as one of the guidelines and proposals for the Integrated Care for Older People (2017) [21]. Evidence-based recommendations for health professionals report that physical activity through exercise can also produce improvements in musculoskeletal function, mobility and vitality, prevent severe cognitive impairment and increase wellbeing [21].

The COVID-19 pandemic has caused significant changes in physical activity and sedentary behaviours. According to

Stockwell et al. [22] several populations worldwide showed a decrease in physical activity and increases in sedentary behaviours during their respective lockdowns. The impact of isolation has drastically reduced the level of habitual physical activity of older adults [23], accentuating the risks and harmful effects on mental health, especially in those older adults affected by diseases and other comorbidities, such as diabetes, cardiovascular diseases, respiratory diseases, cancer and other chronic conditions [24]. In addition, due to fear of contagion and a high level of transmissibility, many older people have suspended medical appointments and routines such as consultations and other procedures, regular exams, and nonurgent visits to hospitals and specialized clinics. The abrupt interruption of the physical activity routine directly affects the self-confidence, autonomy and self-esteem of older adults, factors that are protective for good mental health. Strategies need to be offered to change this health condition, which tends to worsen if changes are not implemented.

The main guidelines of the American College of Sports Medicine (ACSM), American Heart Association (AHA), Center for Disease Control (CDC) and World Health Organization (WHO) are often referenced for exercise prescription for older people. While not highlighting the benefits for mental health, the new recommendations for older adults (65 and over) demonstrate revised evidence on physical activity and the results of sedentary behaviour. Additional health-related results have been reviewed due to their significant importance for older people: (1) falls; (2) injuries related to falls; (3) physical function; (4) fragility; and (5) osteoporosis [25].

For older adults, physical activity and exercise can be even more important than for healthy people, may prevent or at least delay the onset of some mental disorders, in addition to having therapeutic effects, either as an intervention or as an aid in the treatment of mental disorders. For older people with health problems, the fact that they are physically active can increase the likelihood of recovery from mental illness [26]. Both short and long-term effects showed a reduction in medication for older adults. The dose–response considered ideal for this population indicates activities of light to moderate intensity with an almost weekly frequency [27]. It is recommended that older adults perform at least 150–300 min of moderate intensity or 75–150 min of vigorous intensity physical activity or an equivalent combination of moderate intensity and aerobic physical activity of vigorous intensity, per week [25]. However, these guidelines are still underused and underestimated by health professionals in general, requiring methods to overcome these barriers [28]. The medical and sports sciences and physiotherapy, for example, have the opportunity to seek alternatives, innovations and solutions to these problems and limitations.

Especially with respect to depression, exercise has been studied as a potential nonpharmacological treatment in

several populations [29, 30]. Regarding mood, physical activity at home should be seen as a distractor for older adults. Through the distraction hypothesis, an exercise session can be used to avoid negative and worrying thoughts [31], even in short 20-min sessions. Loneliness is common in old age [32]. Exercise moments can be a positive experience of solitude that allows space for distraction, reflection and freedom for the practitioner. Furthermore, completing a task with effort fosters the self-efficacy/mastery hypothesis theory, in which a feeling of mastery elevates mood [31]. Furthermore, the effect of physical activity and exercise has been shown to be significantly positive for longevity. One of the reasons behind this is the length of the telomeres in the white blood cells that are associated with longevity, due to the chain reaction of healthy habits, such as exercise, physical activity, and reduction in the body mass index, contributing to the change in lifestyle [33, 34].

In addition to the psychological benefits, exercise has also been shown to potentiate the effects of vaccination in this age group, implying double benefits for this population. Robust evidence has shown that stress, depression, loneliness and inappropriate health behaviours can impair the immune system's response to vaccines; this effect may be greater in vulnerable groups, such as the elderly, thus, the psychological effects of exercise are implicated in reducing the prevalence of adverse effects related to vaccines [35]. Although specific studies with COVID-19 vaccines have not yet been conducted, experience from the previous vaccination programs suggests that regular exercise may be an effective strategy for increasing antibody responses [36]. Another study reveals that there is a greater induction of antibodies in the follow-up of vaccination in physically active older people, indicating better immunological responses to vaccination programs in this population [37].

Physical activity through exercise has shown positive effects in terms of preventing deterioration and delaying age-related cognitive decline. Home exercise is an alternative and has been recognized as a therapy option to mitigate the physical and mental consequences of the COVID-19 quarantine in older adults [38]. Body weight exercises at home can be seen as a novelty for older adults and recently, novelty was considered a key determinant for physical activity adherence [39]. In this sense, satisfying the need for novelty, which could be one of the Basic Psychological Needs, through the inclusion of new or alternative exercises in the exercise program [39] could stimulate the interest and enjoyment of older adults at home, increasing physical activity adherence.

Even in older people who undergo severe treatments due to comorbidities such as cancer, physical activity at home has been shown to have positive effects on social, emotional well-being, anxiety and mood [40, 41]. Hospitalized older people were also submitted to physical activity

independently, similar to physical activities performed at home, as a way to neutralize physical and mental decline in the period they remained in the COVID-19 unit. Even with a small number of participants, the results showed a significant trend in the clinical improvement of the participants, although improvements were not observed in the state of anxiety, depression and physical performance [42].

It is important to consider that the majority of older people have some limitations in conditions for exercising indoors, such as space and equipment, which can be minimized through simplified physical activity programs. These programs can include adapted physical activities based on routine activities, such as getting up from chairs several times with or without help, flexing arms while holding bottles and other movements with the individual's own body weight [43]. In addition, activities that involve dancing for older adults demonstrate physical and psychological benefits and can be easily incorporated into forms of leisure [44].

Another alternative is physical activities that associate technology and body movements (e.g. active video games—exergames) [45]. These strategies provide improvement in strength, balance, flexibility, coordination, mental health, reaction time, attention and inhibition for this population [46]. In addition to being strongly associated, the inclusion of digital technology with body movement enhances cognitive improvement in older people. The recent advanced applications offer home training programs for older adults using virtual immersion devices, although at the moment they need to be further tested and validated before being proposed for autonomous physical activity at home [47].

Support from family members or caregivers is essential for possible guidance on physical activity practices, although there are limitations [8]. Evidence has shown that social support for physical activity increases physical activity among older adults, especially when interventions include family support [48]. Social support is also fundamental to satisfy another basic psychological need—relatedness [49]. Interventions based on the face-to-face counselling or group sessions have proven to be the most effective to motivate and assist physical exercise in independently living older adults [50]. Therefore, virtual communities (or social networks) could also represent a solution to support older adults in achieving their daily physical activity goals [51].

Although physical distance is necessary, one of the strategies to improve wellbeing or face moments of loneliness with pleasure is performance of physical activities which, in addition to improving functional aspects can contribute to increased autonomy and general wellbeing. The advent of telemedicine has brought new perspectives for health, but this remote technology can also go beyond clinical monitoring and reach aspects related to the promotion of physical activity, in addition to encouraging and increasing healthier practices and routines.

Considering that social isolation is a problem that afflicted some older adults even prior to the pandemic, with serious damage to mental health and that in 2020 and 2021 with the risks of COVID-19, isolation, and restriction of movement and physical activity have become even more critical [52], it is essential that researchers, students and professionals in health sciences produce knowledge and applied alternatives to support and guide the older people facing these challenges. The desirable goal would be, even with social isolation imposed by the pandemic, to seek to increase the practice of physical activities of older adults, with care, paying attention to the limitations that this population faces in different socioeconomic and cultural conditions. The quantity and quality of studies and proposals for exercise and games practices for older adults have expanded in the sciences [53], and from this new reality in 2021, have gained a stimulus to transform these limitations into opportunities to expand access to information, guidance, and, who knows, safer and more preventive practices.

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## Declarations

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