



## Review Article

# Physical Exercise Programs and the Spanish Post-Pandemic Context

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### Abstract

The implementation of sports habits in the elderly is important to establish efficient prevention policies that help them keep their quality of life in the context of pandemic. So, this manuscript will show the principal lines to perform physical activity with the elderly during a lockdown period. With stay-at-home lockdown measures, many elderly people spend more time on their own and have lost their support and health networks. Physical activity has been proven to be an effective therapy for most physical and mental diseases. Together with its well-known benefits, there is some first evidence that relates regular exercise with a reduction in the risk for acute respiratory distress, a significant cause of death in the case of COVID-19. Therefore, there is still the need to perform physical activity on a regular basis during lockdown and in the new periods of normalcy among the elderly population. Even though we get over the COVID-19 crisis, the healthcare, social, and sports systems will change in order to prevent possible new outbreaks or similar situations, and will have to keep on applying imaginative and effective strategies in order to maintain this continued physical activity practice. This implies considering post-COVID physical exercise as a multimodal practice to have an impact on the different dimensions of the elderly, whether frail or not. This multimodal vision is related to:

- Sports centers, whose focus will be on gaining customer loyalty among groups with special vulnerability, combining physical training sessions with home sessions conducted by a monitor of reference, thus preventing the effect of social isolation
- One of the main developments that will be carried out has to do with the new technologies, including those systems using sensors and mobile phones to support monitoring in the daily

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Citation: Fortuño-Godes J, Guerra-Balic M (2020) Physical Exercise Programs and the Spanish Post-Pandemic Context. J Gerontol Geriatr Med 6: 064.

Received: July 25, 2020; Accepted: July 27, 2020; Published: August 06, 2020

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tasks of the elderly, not only in the field of medicine but also in the fields of social and community services

- Finally, we have to consider outdoor activities. Outdoor facilities of gyms can be a key element for the post-pandemic periods of new normalcy. In any case, they will have to adopt the prevention measures as established by healthcare institutions

Despite the negative effects of the crisis, this situation also offers opportunities to find new ways for performing physical exercise and develop new technological ways that promote it. The COVID-19 pandemic has gathered the joint work of direct care professionals, sports managers, healthcare providers, and researchers, who are working to find novel and appropriate solutions to maintain physical activity habits for large groups of people.

**Keywords:** Aging; COVID-19; Physical exercise

### Relationship between Population Aging and Covid-19

Physical exercise and sport practice in the elderly has become an important instrument to keep social relationships, prevent disease and increase life expectancy in Spain in the last 35 years. The effort carried out by public and private institutions with awareness campaigns and the emergence of physical exercise programs adapted to specific needs have promoted the consolidation of a “sports culture” with a unique identity in this group. The elderly represent the segment of population with the fastest growth rate worldwide. Spain is precisely one of the countries with the highest percentage of people over 65 [1], with a total of 9,057,193 elderly people in January 2019, that is, 19.3% of the total population of 47,026,208, according to data updated by the Spanish Instituto Nacional de Estadística [2]. If the current figures of fertility, mortality and migration are kept with the entry of the Baby Boom 1960-1975 generation, which will begin to retire on 2024, the number of elderly people is expected to double in 2050. The pressure on social and healthcare protection systems will continue to increase and will be very remarkable in the 2040s. The implementation of sport habits in the elderly is important to establish efficient prevention policies that lighten this institutional pressure and at the same time help to keep the population’s quality of life.

To this, we have to add that the prevalence of COVID-19 cases is higher among people over 50 years of age in comparison to any other age group [2]. Moreover, the elderly are not only the most affected ones, but also the group with the highest mortality rate. The cases of deceased patients are significantly higher in people with an average age of 83 in comparison to non-deceased patients with an average age of 58 [3]. Together with the consequences deriving from the aging process, the elderly have to bear the added pressure related to the lockdown process. So, this manuscript will show the principal lines to perform physical activity with the elderly during a lockdown period.

### Between the Loneliness Epidemic and the Covid-19 Pandemic

The Continuous Household Survey by the Spanish Instituto Nacional de Estadística showed that there were a total of 4,732,400

people living on their own in 2019 in Spain [2]. Out of the total, 2,037,700 (43.1%) were 65 or older. With these numbers, it is not surprising that social isolation (low quantity and quality of contacts) and loneliness (subjective perception) have been described as an epidemic [4] and are a part of the most current public health issues. Scientific evidence shows that both factors have remarkable effects on many aspects in the health of the elderly. People who feel lonely or are socially isolated are at a higher risk of developing physical and mental health problems, and require a greater use of health-related services [5]. They are also associated to a higher risk of mortality [6]. As a reference, these percentages are similar to those at risk of disease due to smoking 15 cigarettes a day or having an alcohol-related condition, and also risks associated to obesity [6]. Other studies have suggested that the risk of developing dementia for people with high levels of loneliness are 1.58 higher than for people integrated in a social network [7]. Cognitive effects have also been detected in cases of loneliness [8]. Long periods of isolation due to quarantine or disease have negative effects on mental wellbeing, increase in rates of depression and suicide [9].

From a positive perspective, if the level of social commitment increases, there is a decrease in the levels of disability and lower mortality rate [5,10]. Individuals with stronger social relationships show 50% more likelihood of survival [6], improve their adherence to medical treatments [11], and decrease their hospitalization time [12]. To this well-documented effect, we have to add the impact that COVID-19 will have on mental and social health [13]. The COVID-19 pandemic has involved a process of isolation for all age groups, but specially in the elderly, as they are a vulnerable group. With stay-at-home lockdown, many elderly people spend more time on their own and have lost their usual support and healthcare networks. Many of the traditional strategies to integrate the elderly have suddenly become obsolete with the new normal. Community kitchens, community physical exercise, or recreational activities in groups have been cancelled suddenly, and important sources of social relationship have been lost [14].

It is still too soon to know the consequences of social distancing and isolation measures established by public institutions. We will have to wait for results from studies about the effects of the sensation of death risk due to the coronavirus or the stress for the possible effects of the infection, including contact with their carers [15]. As a reference, retrospective studies on the SARS epidemic in 2003 found that suicide rates among older adults increased during the epidemic [16]. Even though the COVID-19 crisis is overcome, the healthcare, social, and sport systems will change to prevent possible outbreaks or similar situations, and will have to keep on applying imaginative and effective strategies to keep contact with their older users. It is difficult to foresee the future scenario, but we will describe next what lines of development specialists can offer to guarantee the maintenance of physical exercise practice in the scenario of the new normal.

## Role of Physical Activity

Physical exercise has been proven to be an efficient therapy for most chronic diseases with therapeutic or preventive effects both in mental and physical health. In fact, exercise is considered to be a real medicine, if we consider its benefits, from an epidemiological perspective. These effects are particularly significant in the case of the elderly [17]. Boreskie et al., [18] summarized the consensus

recommendations relevant during the COVID-19 pandemic to slow down frailty progression and health declines among older adults. Of the 4 described elements, 3 of them can be worked on through appropriate physical exercise programs: socialization (with community sport programs), nutrition, vitamin D (by promoting outdoor physical practice) and physical exercise. This gives us an idea of the preventive and therapeutic potential of physical exercise. To the benefits of physical activity practice, largely studied by specialized literature, we have to add some first evidence that relates regular exercise with risk reduction in people with acute respiratory distress syndrome, a significant cause of death in patients with the virus [19].

There is still, therefore, the need to perform physical exercise in a continued manner during lockdown and in the new periods of normalcy among the elderly. Patterns for the elderly suggest between 150 and 300 minutes of moderate- and vigorous-intensity aerobic physical activity per week, with muscle-strengthening activities at least twice a week [20]. In the future we have to implement strategies to help avoid frailty progression and health declines among frail older adults [18]. Exercise recommendations for pre-frail and frail older adult groups include multi-component exercise with emphasis on muscle-strengthening, complemented with aerobic exercises and balance and flexibility training [21].

Given that the time devoted to exercise in situations of lockdown may be reduced to less than suggested, emphasis should be placed on reducing sedentary time in order to slow down frailty progression [22]. Furthermore, we should reinforce the message that any physical activity performed at home, such as daily activities, climbing a flight of stairs, gardening, getting up from your seat... or any other activity of any length will have a positive impact on the general health of the people involved [23]. It has also been observed that, in immediate post-lockdown periods, the interest for such disciplines as yoga has increased due to the need to do relaxation activities to better manage the uncertainty of the current situation [24]. Implementing mindfulness-related practices [25,26] or other alternative activities that put the emphasis on body awareness and full attention processes may help to decrease levels of anxiety and stress, as they activate the parasympathetic nervous system [27], and thus promote the personal use of self-suggestion strategies in front of social distancing and other consequences of this crisis.

We could say that, to lessen the effects of lockdown and mobility restriction extendedly, it is important to have an integral vision of physical practice that includes physical, psychological, and social aspects of the people involved. This implies considering post-COVID physical exercise as a multi-modal practice, where different practice formats are combined to have an impact on the different dimensions of the elderly.

## Home Fitness Revolution

The lockdown due to COVID-19 has led to the closing of sports and social centers where the elderly usually perform their physical activity. As a result of this context of restriction, sports centers have set up different online alternatives to do physical activity at home during lockdown with the aim of keeping contact with their users and give continuity to their work. Different possibilities of on-demand and streaming training have become popular during the pandemic, available online via social networks. But beyond COVID-19, this trend of watching sessions implemented as a palliative measure in

a context of shortage will develop into a situation of new normalcy and will work as a complement to in-person sessions. In the case of people with a certain level of frailty, with difficulties for movement, this kind of audiovisual material may be very useful as it gives them possibilities for motor activity with no need to get out of their home.

Furthermore, the use of physical fitness material at home (Home Fitness) has become more popular due to its easy access and safety<sup>1</sup> [28]. The use of stationary bicycles, balance platforms, treadmill systems, or free weight devices has increased during the first term of 2020 [29]. A significant peculiarity is that a large part of this material is connected to interactive program applications that allow us to monitor the type of effort carried out. They provide guidelines for beginners or more specialized developments for more experienced users which also require exercise equipment at home. Moreover, some of these applications promote the relationship with other platform users, which is another motivational element. Some others of these applications also offer a metrical health follow-up, with such parameters as number of steps, daily standing time, sleep hours, spent calories, type of exercise performed, connected to the newest portable technology such as Apple watches, Garmin and Fitbit devices to track activities over time [28]. Although their use is a bit complex for a certain profile of older adults, the near future will lead us to design more intuitive specific instruments, adapted to people not very used to using new technologies.

Even though the physical activity interventions that best reduce effects of isolation are those when group members gather more than once a week and a health professional is involved in the development of the intervention [30], in-person/online mixed formulas will definitely be the most used in the next months. Sports centers will focus their interest in building customer loyalty among groups of users with special vulnerability, by combining physical training sessions in sports centers and other sessions at home, with these users being monitored by professionals connected to their sports center of reference. The point is then to give a new shift to the use of new technologies in a group that has always presented an important digital gap.

## Role of New Technologies

One of the most important healthcare and social challenges in our society is to balance the incidence of aging-related chronic conditions and growing old in the community with some degree of independence. For this, it is extremely important to age in such a way that we can adapt our capacities to the environment where we live in order to preserve our quality of life. And here the adaptation of the gerontological reality to the new technologies is a priority. Even more so in a context of COVID-19 lockdown. The quick advances in technology are revolutionizing disease management protocols, particularly among frail older adults with chronic conditions with the aim of reducing hospital admission and mortality rates by using long-distance monitoring and mobile devices [28,31,32]. Healthcare professionals can then revise individual health data and develop a personalized exercise program on the basis of comments written in the apps and portable devices. This personalized program can be monitored in real time, thus providing carers with unrestricted access to the daily activities of patients that used to be inaccessible, if the patients agree.

1. Salter explains that, in the first term of 2020, their “homefitness” line of business has increased by 30%. cmdsport, 2020. Retrieved on 10/07/2020 from: <https://www.cmdsport.com/esencial/cmd-fitnessgym/salter-preve-umentar-sus-ventas-un-30-este-2020>

As mobile phones increase their capacity for processing and storing and include integrated sensors and visualization and interaction mechanisms, new outputs will be added to the healthcare sector and will be adapted to the social and physical training fields. Sapci and Sapci [33] explored current research tendencies on remote monitoring, the adaptation of smart homes, and artificial intelligence-driven control systems. They pointed that one of the main future developments is related to systems that use sensors and mobile phones to help monitoring daily tasks in the elderly, not only in medicine but also in other fields such as social and community services. As it happened at the time with young and adult age groups, the inclusion of accelerometers to recognize movement into smart phones opens a new field to control physical activity levels and gait in the elderly at home or residences, particularly among those groups with a higher level of dependence or frailty [34-36]. We have to consider that the levels of frailty particular to older groups covariate with the capacity of movement in the elderly. Fried et al., [37] defined frailty operatively as a clinical syndrome in which three or more of the following criteria are present: weight loss, weakness and exhaustion, poor grip strength, slow walking speed, and low physical activity. Three of the five criteria are elements related to physical exercise. For this, a large part of the current effort to avoid and prevent frailty focuses on analyzing movement and physical activity [38], detecting falls [39], or monitoring motor impairments such as Parkinson’s [40], by using accelerometers and questionnaires that assess other relevant clinical parameters. Furthermore, the development of monitoring and data analysis programs will allow us to implement behavior patterns with an important degree of personalization mainly through audiovisual information that makes it easy to understand by older adults and help them acquire healthy habits.

Those professionals in direct contact with users will give them online advice to promote healthy changes in behavior among users in the long term, by using a systematized method of repeating the action or advice in a simple, brief but consistent manner (for about 10 weeks), as scientific psychological evidence shows, through the behavioral change model [41]. Visual messages based on usual positions such as supports on the table or exercises using a chair or lifting up home objects safely will be very useful. Moreover, it will be possible to set out small objectives in the short term, such as increasing the number of steps per day, by using pedometers or phone applications that boost motivation [42]. A problem to be solved in the specific application of new technologies is the importance of the creation of some affective bond between the elderly person and the technical staff that monitor the proposals of such application. This relationship can be crucial for the elderly person’s adherence to these technologies. From this perspective, we think that the total automation of this sort of processes is still not clear for certain profiles of older adults such as the most vulnerable ones. We would rather point to a mixed process between implementing automatic processes and in-person methods that guarantees direct contact in part of the intervention between user and staff.

## Outdoor Practice

Spain enjoys a climate that extremely facilitates working in natural environments. Outdoor sports proposals for the elderly are not new. The public administrations have implemented, in the last years, such varied programs as walks, adapted Nordic walking, and outdoor tai chi, or have set up outdoor exercise machine structures specific for the elderly [43]. New alternatives, such as therapeutic gardens inside

public parks, are emerging with dependent people or with a certain degree of frailty in mind [44]. Furthermore, the outdoor facilities of gyms can be a key element during summer in this post-pandemic period of new normal. External areas of gyms have become one of the most valued aspects by users of fitness and health centers in a context where summer temperatures, post-lockdown psychology, and the concept of vacation merge [24].

Outdoor exercise allows for the relaxation of social distancing measures in comparison with indoor spaces, even though the minimum compulsory distance must be respected. Walking, riding a bike, or jogging allows users to get some fresh air without close contact with other people. But it is important to remember that, due to the aerodynamic effects of movement, some additional precautions of social distancing have to be taken. For instance, you should avoid walking or running in the aerodynamic current created by the person in front of you, or in this case your social distance should be bigger depending on whether you are walking or running [45]. Public administrations encourage the use of face masks while being outdoors. The use of a face mask while doing exercise, even low-intensity, may make breathing not easy. Asthmatic or dysfunctional respiratory processes may be an added inconvenient. Finding a breathable mask that helps us breathing may be important. Their implementation should be gradual, avoiding superficial breathing in order to prevent hyperventilation.

It is also important to keep a social vision of outdoor practice. Try not to do exercise in non-familiar groups. This can be a good time to do exercise with your pet. Finally, it is necessary to be kind to those around us during exercise, because this is a difficult time for all of us. A gesture with your hand or head can help improve the mood of everyone. Despite the negative effects of the crisis, this situation also presents opportunities to find new ways of physical exercise practice and develop new technological forms to promote it. The COVID-19 pandemic has gathered the joint work of direct care professionals, sports managers, healthcare providers, and researchers, who are working to find novel and appropriate solutions to maintain physical activity habits for large groups of people.

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