

# CARDIAC REHABILITATION DURING COVID-19

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**Introduction.** The world today is an inconceivable period of history, which is filled with an extreme number of challenges and pressure on the healthcare systems of world countries without exceptions, especially in the fields of physical therapy and rehabilitation systems, generally.

The ongoing crisis started with a new-type coronavirus (severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]) in December 2019, with the first case registered in China, and in a short period of time spreading globally, leading to a world-scale pandemic. One of the major challenges has been the limited amount of information available on the novel disease, especially about the clinical characteristics of infected people, needing intensive care. While SARS-CoV-2 was announced a pandemic by the World Health Organization on March 11, 2020, currently, as of September 3, 2020, there have been 27,155,972 registered cases of COVID-19 and 885,034 deaths associated with the virus worldwide. Kazakhstan, in no terms is an exception, as despite the downshift in the transmission rate, there have been 106,032 cases confirmed with 1,588 fatalities. Thereby, since the pandemic is ongoing and there is no certainty on its potential spread limits, there is a solidarity in the fact that it is the necessity of rehabilitation after COVID-19.

**The complication and early intervention.** The following abstract will cover the topic of technological development during the COVID-19 pandemic, specifically the tools of information-spreading and raising general awareness. As well as distance monitoring mechanisms by the specialists, allowing to decrease the pressure on the healthcare system.

The high transmission rates of COVID-19 and its rapid spread across the globe led to the establishment of quarantine and self-isolation regimes, associated with the closing of various organizations and institutions, including organizations of education, stores, non-essential business, entertainment facilities, etc. The healthcare institutions, in turn, also decreased the number of provided services, as the attention to most of the non-urgent cases, diagnostics and rehabilitation has been limited, as many hospitals switched to closed-manner work to prevent the virus transmission. However, the end of pandemics and recovery to an ordinary lifestyle can potentially be interrupted by several consequent healthcare issues, not only in pulmonology but also in other areas. For instance, there are risks of the increased cases of diabetes mellitus, cardiovascular diseases, as well as endocrinological or neuropsychiatric ones, both because of the direct virus complications, and due to the serious changes in people's lifestyles [1, 2].

Hence, such comorbidities occur frequently among the COVID-19 patients, the most distinctive and frequent of which have occurred to be hypertension (17.1% incidence), cardiac and cerebrovascular disease (16.4% occurrence), as well as diabetes (9.7%). More importantly, the incidence of the aforementioned diseases was significantly higher among the patients with serious conditions of COVID-19 (2-, 3-, and 4-times larger respectively) [3]. Thereby, the cardiovascular metabolic disease is not only a strong risk factor for COVID-19 infection, but also leads to a worse clinical consequence [4, 5].

One of the most effective ways to decrease the risks of cardiovascular diseases and improve the general health conditions of the CVD-patients is cardiac rehabilitation (CR). CR is a long-term and encompassing set of procedures, including physical exercises, training, and education, as well as psychological assistance and need for the life-style changes for the patients [6,7]. However, the current crisis and necessity of human isolation significantly limit the availability of CR, as many medical centers are closed for non-urgent needs. Hence, the solution to this issue enabling the switch from the current organization-based CR is cardiac tele-rehabilitation (CTR). With the



implementation and usage of CTR, the number of patients can be not only restored to pre-crisis volumes but also be increased due to the availability of the procedure, especially eased logistics and time-requirements, as the length and duration of a course can be set individually. Furthermore, the CTR can be personalized, as training programs and feedback can be developed individually due to the possibility to record of individual health conditions data during the everyday activities [8].

The home tele-rehabilitation approach is also highly effective in financial terms, especially in the cases of corrective therapy monitoring and evaluation. Although the limited in-person patient-doctor interaction between is often considered to be a negative factor, the high risk of infection spreading and necessity of self-isolation during the COVID-19 pandemic turns this drawback around, allowing to create a system with less human interaction, meaning lower risks of spreading the virus. Another drawback of the home tele-rehabilitation is, in fact, the diseases or disabilities (not connected to the COVID-19) among the patients, including sensory and communication disabilities, cognitive impairment, limited vestibular control, as well as other diagnosis requiring closer risk management. However, the volume of such patients is not a majority, thereby allowing the usage of tele-therapy as an effective mechanism of rehabilitation by the experts in a distant manner [9].

**Conclusion.** To sum up, there is a unified global effort for the gradual development of digital infrastructure and engineering systems as a response to the ongoing pandemic. While the efforts themselves vary in their essences, the technology is one of the most effective tools allowing the populations to respond appropriately to the diseases, especially through the digital tools of information sharing, distanced training and fact-checking. Hence, telemedicine has a strong potential to become an empowering instrument and life-saving alternative for those, who seek rehabilitation but have no access to proper care due to quarantine or other reasons.

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