



Research Article

Organization of Protective Regime for Elderly Population in the COVID-19 Pandemic Period

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Received: 27 November 2021; **Accepted:** 03 December 2021; **Published:** 10 December 2021

Citation: Mikhail A Yakushin, Roman V Gorenkov, Tatiana P Vasilieva, Alexander V Melerzanov, Oxana Yu Alexandrova, Sergei Yu Yarotskiy, Aleksandra R Malakhova, Alexey Moskalev, Evelyne Yehudit Bischof. Organization of Protective Regime for Elderly Population in the COVID-19 Pandemic Period. *Journal of Environmental Science and Public Health* 5 (2021): 490-503.

Abstract

The COVID-19 pandemic enforced societies to rapidly restructure industrial, social security, and

public health care processes. Several countries, where organized anti-epidemic measures were implemented, indicated the efficacy of strict adherence to measures

that flexibly balance between self-isolation and social distancing. The population group at the highest risk of mortality and morbidity, most susceptible to infection, and the impactation by stress factors – the elderly - is at the same time strongly endangered by social deprivation, mental health decrease, and suicide. It is thus especially important to establish safe leisure environments and create comfortable conditions for the elderly who live alone. Optimally, a correctly selected set of measures should facilitate efficient use of the free time to enforce physical and mental health, including aspects crucial for the individual quality of life. Here, we propose such a setting of approaches based on the pandemic experience in Russia. We outline general and specific management options that tackle the subpopulation of the elderly, rendering a positive effect on the health status of all citizens, thus at the level of public health.

Keywords: Geroscience; Geriatrics; Sociogeriatrics; Anti-epidemic measures; Protective regime; Infection prevention; Coronavirus; COVID-19; Elderly; Public health; Global health

1. Key Points

- Rational organization of health-promoting leisure activities during the forced self-isolation of the elderly
- Endorsing computer literacy and mastering Internet resources among elderly
- Enforcing implementation of healthy sleep, physical training, alimentation, and additional lifestyle factors among elderly in self-isolation

- Initiating and planning rehabilitation approaches for the post-COVID-19 era

2. Introduction

Different countries reacted variably to the outrage of the pandemic. On average, in most countries with a delayed introduction of anti-epidemic measures, a higher incidence was observed; whereas in countries with a rapid quarantine installation, the situation was quickly stabilized. Most analysts agree that the most effective measure tested in the fight against COVID-19 is the protective regime, the basis of which is self-isolation and (or) forced isolation - observation, quarantine.

The epidemiologic situation with COVID-19 dramatic expansion is not only a medical, but also a huge social problem. Obviously, the world was not ready for that outbreak, and social activities facilitating people's homestay are being developed spontaneously through different means. The elderly as a specific population finds it hard to adjust to social prevention that deepen individual isolation. The elderly also strongly differ biologically due to their age-related physiological, including cerebral/cognitive, decline. This renders them also more vulnerable to reinfections and insufficient vaccine response (ref. <https://pubmed.ncbi.nlm.nih.gov/32229705/>). Thus, protocols for public protection should consider this specific subgroup on an evidence-base.

This article contains suggestions for leisure activities for the elderly during the difficult period of the self-isolation regime, which considers modern living conditions in an urban environment. The regime of

self-isolation, despite restrictive measures, especially affecting the physical and emotional health of the elderly, can be facilitated by leisure, which involves not only entertaining activities but can also be combined with useful pastimes combining physical activity, cognitive development, and communication with family.

3. Materials and Methods

Literature analysis related to protective activities at different levels for the public. Legislative acts of Government and other State authorities report professional medical societies, disease control, research centers, and hospitals.

4. Organization of Protective Regime

The coronavirus pandemic that has swept the world made us take a fresh look at problems that previously seemed insignificant. Who would expect a discussion about medical masks; their mandatory wearing as a preventive measure during respiratory infections was not disputed by anyone and had the status of a postulate? It suddenly turned out that masks do not protect from the virus and it makes sense to wear them only to infected people so as not to infect others [1]. Healthy people need wearable protective equipment, ideally disposable gloves, special glasses, and respirators of high protection class (not lower than FFP2). However, few people correctly apply the whole range of necessary measures of individual protection. One of the most discussed issues is the high tropism of coronavirus to aged people. Mortality from COVID-19 in the age group of 70-80 years is 3.4 times, and in the group of 80+ is 6.4 times higher than in the general population [2]. This fact served as

a reason for classifying 65+ people as a risk group for unfavorable prognosis of the course of the disease.

Several research centers in China, Russia, Europe, and the USA created vaccines for the prevention of Covid. Clinical trials are being carried out actively and vaccination strategies has been successfully implemented in many countries (2021). Relatively effective vaccines are being developed as quickly as possible [3], however, in the coming months, self-isolation, observation, and quarantine remain real protection against infection. This decision was simultaneously reached by analysts from all countries at the forefront of the pandemic [4]. If protection measures are weakened, modeling predicts the next severe pandemic wave, predominantly in a winter [5].

Among the tasks outlined, special attention is paid to the need for strict adherence to the self-isolation regime, especially by elderly and aged citizens. Life confirms the relevance of these measures: daily from different countries terrifying evidence of the spread of a pandemic around the world with the deaths of tens of thousands of its victims, up to 80% of which are representatives of the elder age, is received. Declaring a self-isolation regime is, of course, an important measure in the fight against infection, which allows quickly and effectively interrupting the potential chains of its spread. However, declaring such a regime is half the battle; it is necessary to ensure and optimize its compliance. It is not human nature to sit in one place; persons need communication, nutrition, the implementation of numerous physiological needs. Self-isolation, especially observation and quarantine,

dramatically change stereotypes of life, entail certain hardships and deprivations, which can lead to negative consequences. In regions that got over the COVID-19 epidemic, divorces significantly increased.

Our proposals for the organization of leisure for an elderly person in the period of self-isolation are structured considering the psychology of the elderly person, his life priorities, and the basic principles of applied geriatrics. Some of the proposed measures have been successfully tested during the implementation of the project "Register of centenarians". The most optimal model for implementing the regime of self-isolation (observation) is a summer residence. Spacious ventilated areas (even 6 acres is 600 m², not 60 city ones), dispersal, fresh air, sunlight saturated with ultraviolet are reliable barriers to the spread of infection. In urban environments, self-isolation is more difficult; if possible, family members should be dispersed as much as possible over isolated rooms, avoid crowding, and use personal towels, blankets, and hygiene products.

If there is such an opportunity, it is best to switch to remote work, use the services of food and drug delivery to your home. Many volunteers are ready to come to the aid of lonely, elderly and infirm people. It is important to minimize communication with strangers, including couriers. To do this, you need to consider a non-contact form of transfer of goods and cash, by analogy with the transfer of money when buying and selling through a bank cell. For this purpose, it is necessary to equip a special container in

which the courier will have to put the goods when they are transferred. In those regions where the infrastructure of telemedicine care was created, it is urgent to reorient its activities to solving problems around COVID-19: transparent information support, medical consultations, organization of emergency diagnostics and hospitalization, assistance in the provision of food and medicine. On 03/19/2020 The State Duma of the Russian Federation adopted a bill providing for the sale of prescription drugs in emergency situations. Implementation of the bill will greatly facilitate drug provision in a pandemic.

In contrast to the many negative consequences, the regime of family self-isolation for elderly people was reflected in several preferences: there is a real opportunity to learn computer literacy and master Internet resources. In normal times, helping an elderly relative in this matter encounters many objective obstacles, the most important of which is a lack of time. Self-isolation eliminates this obstacle: for several weeks, children and grandchildren have round-the-clock communication; moreover, for both the older and the younger generation, the issue of leisure activities is of comparable relevance. Mastering computer and Internet skills are better combined with solving urgent issues for an elderly person, especially those relating to their own health; such motivation contributes to the reliable consolidation of knowledge.

The starting point in organizing leisure activities for the period of self-isolation is the selection of a person responsible for the education of elderly relatives. As practice shows, high school grandchildren are best

suited to this role. First, you need to write down the names of all the diseases that the elderly relative suffers from and the medicines that he takes. These data should be entered in a previously prepared electronic spreadsheet. Then, using one of the search engines, the corresponding physical therapy complex, therapeutic physical factors, therapeutic nutrition, and suitable medicinal plants are determined for each disease. When choosing therapeutic factors, it should first be guided not by indications, but by the absence of contraindications. It is important that the search initiative come from the elder person so that all search actions are carried out by him personally and are subsequently consolidated many times.

When choosing a physiotherapy complex, preference should be given to exercises performed lying or standing; it is advisable to exclude large-amplitude rotations around the longitudinal axis, especially tilts with turns. As a rule, physiotherapy for age-associated diseases have a common basis, adapt to each other, and are easily combined. Each exercise should be evaluated in terms of its feasibility; depending on age and physical abilities, a limit of potential opportunities is determined. The number of exercises should not exceed 5-10 and recommended to perform 1-2 times a day for 5-15 minutes. A physiotherapy effect should be expected in the case of joint training of several family members from different age groups. After the first sessions, it is necessary to revise the exercise therapy and, if necessary, replace complex exercises with simpler, ergonomically adequate ones. Among therapeutic physical factors, water procedures are the most accessible. With the help of special nozzles, a shower can be easily converted into a

medical one, for example, into a Vichy shower. The special configuration of the jets creates the effect of natural rain; zones of ionization are formed on the body, giving a restorative healing effect. Regular douche with a gradual decrease in temperature has a hardening effect and increases the anti-infection resistance of the body. It is important to follow a systematic approach to hardening; misuse of this process can have the opposite effect.

Sleep quality (total duration, discontinuity, duration of deep sleep phase) is associated with immunity and chronic inflammation [6]. In particular, the sleep regulator hormone melatonin has anti-inflammatory and regulatory effects on immunity [7]. Clinical trials of melatonin in COVID are still in the planning stages [8]. Clinical evidence suggests that those who slept less than 7 hours a day were almost 3 times more prone to colds infection than those who slept 8 or more hours a day [9]. It is highly likely that enough deep sleep will strengthen the immune system and reduce the risk of covid disease. At least, good night's sleep improves COVID-19 vaccine efficacy [10]. There are a few simple rules to follow to improve your sleep quality. Avoid blue light sources before bed (from LEDs, indoor and outdoor lighting, device screens), as it reduces the production of the sleep hormone melatonin [11]. Avoid exercising, eating, and drinking alcohol three hours before bedtime. Taking a warm shower before bed. The room should be ventilated for sleeping and the temperature in it should not exceed 21 ° C. It needed to go to bed at the same time every day, which will synchronize your internal clocks. For insomnia, use autogenic training, meditation, or cognitive-behavioral therapy [12].

The severe covid pandemic goes hand in hand with the visceral fat pandemic. In the BMJ study, the age-adjusted prevalence of age-adjusted abdominal obesity increased from 54.5% in 2011–2012 to 59.1% in 2017–2018 [13]. The new results show that it is visceral obesity and characteristics of metabolic health disorders such as hyperglycemia, hypertension and subclinical inflammation that are associated with a high risk of severe COVID-19 [14]. If there is a problem with abdominal (visceral) obesity, it is necessary to take certain measures that will not only normalize body weight but also avoid the severe course of covid. In this case, it is important to eat food in large portions, but in 2 or 3 meals, between which there should be intervals without snacks for at least 4 hours. It is advisable to stop eating at least 3 hours before bedtime. Ideally, 12-16 hours should elapse between evening and morning meals. You should regularly include a variety of vegetables, legumes, and whole grains in your diet, with occasional additions of nuts, seeds, fish, or poultry. Breakfast and lunch should be the densest, while dinner can consist of vegetable salad or light soup. One or two times a week, you can give yourself a fasting day. There are only non-starchy raw or boiled vegetables (different types of cabbage, zucchini, eggplant), seasoned with extra virgin olive oil. It is best to exclude refined and processed foods, that is, semi-finished or processed foods. You will have to say goodbye to sweets, soda, white bread, and rice, as well as canned food. An alternative can be found in foods rich in plant fiber (berries, fruits, juicy vegetables). To lose weight and improve your mood will help daily aerobic exercise of moderate intensity, at least 15 minutes a day. It can be anything that

pleases you: swimming, slow running, brisk walking, climbing stairs, cycling, water aerobics, tennis, volleyball, dancing, house cleaning, gardening.

Dietary issues are of interest to most elderly people. To begin with, it is necessary to determine the useful and harmful products for each of the existing diseases. Information is entered into a spreadsheet and then summarized. A single list is compiled, from which products harmful to at least one of the diseases existing in humans are excluded. At the next stage, each of the selected products must pass an individual tolerance test. In old age, many substances are poorly absorbed. The most common is intolerance to lactose-containing (milk or less often sour-milk) products, acquired celiac disease (intolerance to cereals and products prepared on their basis, including sausages and some kinds of cheese), intolerance to foods rich in histamine (fermented products, such as cheeses, yogurt, sour cream, buttermilk, and kefir, sauerkraut and kimchi, wine and beer, legumes, cinnamon, some vegetables and fruits (citrus fruits, strawberries, pineapples, tomatoes), chocolate, sea fish, peanuts). Intolerance to tartrazine, which is found in cereals, pasta, frozen bakery products, chips, caramel, ice cream, colored carbonated drinks, and preservatives (fresh fruits and vegetables, dried fruits, gelatin, french fries, chips, sausages, pickles, cheeses, sauces, seafood) is less common.

The problem of nutrition in modern western society, especially among the elderly, is the dichotomy of a simultaneous excess of calories and a lack of essential nutrients (Kalache et al., 2019). The common practice of nutrition is especially harmful in conditions of less

activity with self-isolation. A balanced diet should include at least 40% and not more than 70% carbohydrates (Seidelmann et al., 2018). Slow-release carbohydrates (whole grains) should be preferred, while added sugar should be eliminated. It is worthwhile to avoid sweet fruits (not more than one such some fruit per day), corn syrup and honey, as they contain a lot of fructose, linked to obesity and increased hepatic de novo lipogenesis, cardiometabolic risk factors [15]. Trans fatty acids contained in margarine and purchased products prepared with it (baked goods, chips) increasing the risk of mortality [16]. Normalization of the ratio omega-6/omega-3 helps to reduce inflammatory reactions [17]. Omega-3s are contained in the following foods: linseed oil (alpha-linolenic acid), fatty fish or seafood (eicosapentaenoic and docosahexaenoic acid) 1-2 times a week. Monounsaturated fats have a geroprotective effect [18] and can be found in olive oil (preferably first cold-pressed), avocado, or almonds. Based on the fresh systematic review of meta-analyses [19], consuming 100 g of fresh fruit per day reduces the risks of certain cancers, stroke, and overall mortality. Canned fruits, in contrast, increased the risks of overall mortality and cardiovascular disease. Fresh, non-starchy vegetables reduced the risks of cancer, coronary heart disease, and overall mortality. Pickled vegetables increased the risk of stomach cancer. In conditions of a sedentary lifestyle in self-isolation, intermittent fasting, which reduces the risk of many age-related diseases may be useful [20].

For elder women, mastering computer skills can be done in parallel with mastering recipes. The days

when a cookbook was required for cooking are gone. Now any culinary site allows countless numbers of options for preparing a variety of dishes. You can take leisure in several directions: you can daily diversify the diet with new (unusual, exotic) dishes, or each time prepares a special version of the same favorite dish. However, during a pandemic, it is better to focus on preparing simple, balanced, and reasonably fortified foods. The requirements for healthy geriatric nutrition are simple and understandable:

1. Food should be regular and fractional, 2-3 times a day (the calorie content of the breakfast should be 35%, lunch - 40%, dinner - 25%);
2. Food should be easily digestible (in case of problems with teeth - rubbed);
3. Morning loading and nightly unloading of digestion is necessary (do not eat 2-3 hours before bedtime);
4. For lunch, you need a hot meal;
5. Eat without haste, with pleasure;
6. Chew food thoroughly;
7. Do not eat too cold or too hot food.

During the epidemic, many experts advise increasing the consumption of food adaptogens - products that increase the body's resistance to aggressive environmental influences, including infection. It is considered useful to add garlic, onions, ginger, and turmeric to the diet. However, these supplements should not be abused since an overdose of each of them can cause allergies and digestive upsets. In some cases, the body's resistance to infections increases with the use of biostimulants - biologically active substances that strengthen the body's defenses, such as ginseng, *Aralia manchurian*, *Schisandra chinensis*,

Oplopanax, Eleutherococcus senticosus, Rhaponticum carthamoides, Orpin rosy, deer antlers, honey, and products beekeeping. Preference should be given to natural, self-grown products. It is necessary to carefully read the indications and especially contraindications for biostimulants; this is especially true for people with cardiovascular and oncological diseases.

Replenishing the levels of certain vitamins, the absorption, and transport of which is especially affected with aging can affect the replication activity of the SARS-COV-2 virus or severity of COVID-19 symptoms: vitamin D [21], vitamin B12 [22], vitamin C [23]. The anti-inflammatory polyphenol berberine inhibits the replication of other, influenza viruses [24] and delays the development of pulmonary fibrosis [25]. Zinc is an essential micronutrient involved both in the regulation of innate and adaptive immune responses [26]. High intracellular concentrations of zinc inhibit the replication of SARS-CoV-2 by blocking RNA-dependent RNA polymerase [27]. Some natural ionophores, such as dietary plant polyphenols quercetin (red raspberry, black grapes, broccoli, and red onion) and epigallocatechin-gallate (tea), rapidly increased cell concentrations of zinc [28].

Hypertension and diabetes are among the top of COVID-19 co-morbidities [29]. Taurine treatment (1600 mg per day) lowers blood pressure and improves vascular function [30]. Taurine supplementation (1000 mg taurine three times a day for 8 weeks following each meal) in patients with type 2 diabetes showed beneficial effects on oxidative

stress and inflammation in a randomized, double-blind, placebo-controlled study [31]. Already now, it is important to think not only about the prevention and treatment of COVID-19 but also about approaches to rehabilitation. We can only assume what is the life expectancy and degree of disability of survivors of COVID-19? What to oppose pulmonary fibrosis, pneumosclerosis, cardiomyopathy? This is essentially the aging of the most vital organs an accelerated path. It is known that leukotrienes produced during inflammation play a direct role in pulmonary fibrosis [32]. Some natural compounds, such as quercetin can inhibit 5-LOX lipooxygenase producing pro-inflammatory leukotrienes [33]. N-acetylcysteine also targets the formation of 5-LOX leukotrienes [34] and has been shown for idiopathic pulmonary fibrosis [35]. Caffeic acid phenethyl ester (a component of bee propolis) is another potential 5-LOX inhibitor [36].

Optimization of the ratio of omega-6/omega-3 (3:1) contributed to an increase in the synthesis of biologically less active (anti-inflammatory) type 5 leukotrienes [37]. Curcumin suppresses leukotriene B4 production [38]. Lycopene (tomatoes, red peppers), hydroxythirazole (olive oil, olives), naringenin (citrus fruits), beta-carotene are able to suppress the formation of eicosanoids [39].

Medicinal plants, unlike medicaments, have a milder effect and have almost no contraindications, in the absence of overdose and as directed by a doctor. Herbal remedies, i.e., medicines based on medicinal plants are usually well-tolerated by elderly people, do not cause allergies and dangerous side effects. Herbal

remedies have proven themselves in the treatment of many senile ailments, including the correction of gastrointestinal motility (constipation, diarrhea, and flatulence), sleep, mood. Of the many proposals, it is first necessary to select medicinal plants that have a positive effect on several diseases simultaneously, since the principle of multimodal monotherapy is the strategic direction of geriatric therapy - the priority is to prescribe drugs that restore the maximum number of impaired functions, the spectrum of action of which matches the patient's personal morbidity profile as much as possible. The choice should also be given to the well-known herbs common in the area. Despite the apparent harmlessness of herbal remedies, each of them has a certain range of contraindications, each of which must be carefully read.

It is good for elder people to take multiple medications to check them out from time to time. Of course, the main expert in prescribing drugs should be the attending physician; his opinion should be decisive. However, like any person, the doctor can be wrong. Especially often mistakes are made in relation to elderly patients [40]. To minimize the probability of error, it is necessary to carefully study the instructions for use of each medication taken, adhering to the following algorithm:

- a) to study contraindications. If a disease or symptom that a patient has is found in the list of contraindications, it is necessary to stop taking this medicine and urgently consult your doctor.
- b) to study side effects. If the complaints presented by an elderly person correspond to the side effect of one

of the drugs, it is necessary to exclude the possibility of their occurrence.

- c) analyze drug interactions. Many drugs, when used together, enter various chemical reactions with each other. In old age, the likelihood of such an interaction increases, since in the process of drug metabolism a greater number of intermediate products are formed, which, as a rule, are chemically more aggressive. The coincidence of the tested painful sensations with the negative manifestations of drug interaction is another reason for contacting the attending physician.

For people keen on gardening, the Internet can be an ideal assistant and adviser in choosing plants and their growing technology. Computer literacy improvement can be successfully combined with solving utilitarian problems. In the garden, you can grow most herbs; they do not require special care; many of them (for example, mint, lemon balm, chamomile) are weeds. You can order the seeds of medicinal plants on the Internet, having previously read the reviews of people who used this service. Rosehips, raspberries, currants (black and red), gooseberries, dill, caraway seeds, mint, lemon balm, motherwort, calendula, valerian, sweet clover, garden angelica will decorate any country house. Works related to their cultivation are useful and enjoyable, and the results of these works can accelerate recovery from many diseases.

Growing greenhouse crops can be an equally effective way of organizing leisure activities during the period of self-isolation. It should be guided, first, on healthy components of medical nutrition that are good for health. Using the instructions of specialized sites, it is realistic to grow not only the usual greenhouse plants

(tomatoes, cucumbers, zucchini, peppers) but also exotic fruits and vegetables. Seeds, fertilizers, and seedlings can be ordered on the Internet. Many health problems in modern people are associated with emotional stress. This is especially evident with an abundance of bad news that adversely affects the dopamine and serotonin system, levels of stress hormones (adrenaline and cortisol). Stress management, including Schultz's autogenic training, the method of deep slow breathing, the method of Jacobson's relaxation technique, meditation, kinesiotherapy, music therapy, bibliotherapy, ecotherapy, effective time management, optimization of sleep-wakefulness.

An important component of the leisure of an elderly person in the period of self-isolation is communication. Most pensioners are not mobile, that is why they constantly feel a lack of communication. With the help of modern gadgets, you can easily compensate for any degree of this deficit. In the self-isolation regime, you can slowly take control of one of the video communications formats via the Internet. Communication with relatives, acquaintances, former colleagues can brighten up more than one day of leisure. One more enjoyable way to spend time in quarantine can be reading.

Every elderly person experienced a period of shortage of printed materials and remembered how much effort it took to get a good book. Now in easy access, you can find any works of all authors without exception; the main difficulty is the excessive variety of choices; an elder person needs help in understanding the abundance of information. To do this, write out his

favorite authors and titles of works; then you should help him search and archive technologies. Visually impaired people can use the audio reading format; the choice of audiobooks is also quite large.

Another opportunity to organize leisure activities is to watch a video. The mood of elderly relatives will probably rise after a meeting with the "old" cinema. Many will be interested in documentaries, that repertoire is quite extensive. Watching documentaries of historical times, films about animals, nature, sports, scientific achievements can significantly diversify the regime of forced self-isolation. In connection with the current epidemic situation, many museums, exhibitions, art galleries have prepared special applications that make it possible, using the Internet, to visit the corresponding excursions online (for review, please visit <http://mcn.edu/a-guide-to-virtual-museum-resources/>). In a similar way, one can listen to the performances of leading theaters, concert performances, and "visit" television competitions with a high effect of presence. Having learned to use electronic "search engines", an elderly person can easily choose the event of interest for himself.

One of the options for joint family leisure is to compile a home archive. Several sites publish electronic matrices to compose a "family tree." Filling the cells of such a "tree", in a joint conversation with elderly relatives, one can gather a lot of unique information learn family secrets, traditions, and interesting cases from the life of ancestors and even conduct a historical investigation. All this will serve as a rapprochement, strengthen the family, and brighten up the leisure time of forced self-isolation.

We have tested a special format for archiving historical information: interviewing elderly relatives about the happiest day of their life. A person who has lived life must remember such a day in his memory. Most Russian people who have gone through the war consider Victory Day to be the happiest day of their lives. Start recording from the events preceding this day; usually, these events become a kind of faceting of the main action. In the future, it is important to transfer the recording to print format, to edit and archive it in a quality manner.

Great benefits for the health of an elderly person can have medical zoology - communication with pets. If the family has pets, leisure activities will be greatly simplified; observing and caring for animals has a positive effect on a person of any age, but above all on children and the elderly. Joint walks, games with pets create a favorable emotional background and are good physical training.

5. Conclusions

There are many recommendations of different approaches for the public and especially elderly population protection and many different means offered to facilitate quarantine conditions. Further analysis with the participation of physicians and psychologists will show the correlation between undertaken medical and social efforts and outcomes including not only somatic medical conditions but also psychological and mental states of the elderly people at the post-pandemic period. COVID-19 complicated our lives, but at the same time opened new prospects that we had not previously known. During the period of self-isolation, it is possible to

complete things that have remained unfulfilled for years, which was chronically short of time. Whatever the outcome of the epidemic, it is necessary to properly dispose of the opened prospect. This is especially important for elderly people.

Acknowledgment

The study had no sponsor support.

Conflict of Interests

The authors declare the absence of conflict of interests.

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