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PREVENTIVE HOSPITALIZATION OF PATIENTS OVER 65 YEARS OLD WITH COVID-19 AS A WAY TO IMPROVE THE QUALITY OF MEDICAL CARE

© Mikhail G. Karailanov[1, 2, 3], Karina E. Moiseeva[1], Igor G. Prokin[2], Oleg Yu. Bakanev[2], Mikhail S. Panfilov[1], Osman A. Uzhokh-Bazhnokov[1], Victoria V. Slyusareva[1]

[1] Saint Petersburg State Pediatric Medical University. 2 Lithuania, Saint Petersburg 194100 Russian Federation

[2] Military Medical Academy named after S.M. Kirov. 6 Academician Lebedev str., Saint Petersburg 194044 Russian Federation

[3] Saint Petersburg State Healthcare Institution "City Clinic N 19". 11 Prazhskaya str., Saint Petersburg 192238 Russian Federation

Contact information: Mikhail G. Karailanov — Doctor of Medical Sciences, Professor of the Department of Public Health and Healthcare. E-mail: karaylanov@mail.ru ORCID: http://orcid.org/0000-0001-6584-9492 SPIN: 7110-9788

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ABSTRACT. From the time of the emergence and spread of the new coronavirus infection worldwide, medical personnel has repeatedly revised approaches to treating patients of different age groups. During the COVID-19 pandemic, special attention was paid to patients over 65 years of age, in concern with the decrease of physiological reserves, general resistance and stability of the body, and the presence of a number of chronic diseases. This category of patients, as a rule, suffers from cardiovascular, endocrinological, rheumatic diseases, chronic lung diseases and malignant neoplasms. The fundamental factor is the atypical manifestation of COVID-19 disease symptoms in patients over 65 years of age associated with progressive and rapid development of severe complications against the background of existing chronic diseases, including death. Adverse events such as complications and death from COVID-19 are a serious threat for people over 65 years of age. The purpose of the study is to evaluate the effectiveness of preventive hospitalization of patients over 65 years of age with COVID-19 in the city of St. Petersburg in 2021. In order to reduce the risk of complications in patients of the older age group during the COVID-19 pandemic, mandatory preventive hospitalization has been justified, aimed at an early initiation of treatment, round-the-clock monitoring and timely medical intervention. In order to assess the effectiveness of the measures taken during the pandemic, the article analyzed data of preventive hospitalization for 2021, organized in one of the largest districts of the city of St. Petersburg, with up to half a million residents. The results of the study suggest that timely preventive hospitalization has a positive effect on reducing mortality among people over 65 years of age and can be considered as a way to improve the quality and safety of medical care.

KEYWORDS: COVID-19, elderly and senile age, persons over 65 years of age, incidence of COVID-19, mortality from COVID-19, preventive hospitalization

ПРЕВЕНТИВНАЯ ГОСПИТАЛИЗАЦИЯ ПАЦИЕНТОВ СТАРШЕ 65 ЛЕТ С COVID-19 КАК СПОСОБ ПОВЫШЕНИЯ КАЧЕСТВА МЕДИЦИНСКОЙ ПОМОЩИ

© Михаил Георгиевич Карайланов[1, 2 ,3], Карина Евгеньевна Моисеева[1], Игорь Генрихович Прокин[2], Олег Юрьевич Баканев[2], Михаил Сергеевич Панфилов[1], Осман Арифович Ужох-Бажноков[1], Виктория Васильевна Слюсарева[1]

[1] Санкт-Петербургский государственный педиатрический медицинский университет. 194100, г. Санкт-Петербург, ул. Литовская, д. 2

[2] Военно-медицинская академия имени С.М. Кирова. 194044, г. Санкт-Петербург, ул. Академика Лебедева, д. 6

[3] Санкт-Петербургское государственное учреждение здравоохранения «Городская поликлиника № 19». 192238, г. Санкт-Петербург, ул. Пражская, д. 11

Контактная информация: Михаил Георгиевич Карайланов — д.м.н., профессор кафедры общественного здоровья и здравоохранения. E-mail: karaylanov@mail.ru ORCID: http://orcid.org/0000-0001-6584-9492 SPIN: 7110-9788

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РЕЗЮМЕ. С момента появления в мире новой коронавирусной инфекции медицинский персонал неоднократно пересмотрел подходы к лечению пациентов разных возрастных групп. Особое внимание в период пандемии COVID-19 было уделено пациентам старше 65 лет, учитывая у них снижение физиологических резервов, общей сопротивляемости и устойчивости организма, наличие ряда хронических заболеваний. Указанная категория пациентов, как правило, страдает сердечно-сосудистыми, эндокринологическими, ревматическими заболеваниями, хроническими заболеваниями легких и злокачественными новообразованиями. Основополагающим фактором является атипичная картина заболевания COVID-19 у пациентов старше 65 лет с прогрессивным и быстрым развитием тяжелых осложнений на фоне имеющихся хронических заболеваний, вплоть до летального исхода. Такие нежелательные события, как осложнения и смерть от COVID-19, являются серьезной угрозой для лиц старше 65 лет. Целью исследования является оценка эффективности превентивной госпитализации пациентов старше 65 лет с COVID-19 в городе Санкт-Петербург за 2021 год. В целях снижения рисков развития осложнений у пациентов старшей возрастной группы в период пандемии COVID-19 нашла обоснование обязательная их превентивная госпитализация, направленная на раннее начало лечения, круглосуточное наблюдение и своевременное медицинское вмешательство. В статье для оценки эффективности проводимых мероприятий в период пандемии были проанализированы данные превентивной госпитализации за 2021 год, организованной в одном из крупнейших районов города Санкт-Петербурга, насчитывающем до полумиллиона жителей. Полученные результаты исследования позволяют утверждать, что своевременная превентивная госпитализация положительно влияет на снижение смертности среди лиц старше 65 лет и может рассматриваться как способ повышения качества и безопасности медицинской помощи.

КЛЮЧЕВЫЕ СЛОВА: COVID-19, пожилой и старческий возраст, лица старше 65 лет, заболеваемость COVID-19, смертность от COVID-19, превентивная госпитализация

INTRODUCTION

In modern conditions, undesirable events in health care are understood as facts and circumstances that threaten to cause or have caused harm to the life and health of citizens, as well as facts and circumstances that have led to prolongation of the terms of medical care. Undesirable events seriously affect the quality of medical activity and remain an urgent problem of modern healthcare [1–3]. Despite the end of the COVID-19 pandemic, the number of new pathogens has increased in recent years, as well as known but mutated pathogens, which has led to their acquisition of new pathogenic properties, as well as properties that deprive them of sensitivity to the action of the defense mechanisms of the human body. For this reason, diseases, including COVID-19, acute respiratory viral diseases (ARVI) and influenza, sometimes began to acquire unexpected variants of course. Tolerance of infectious agents to drugs is growing, which may cause severe disease course.

A new coronavirus infection (COVID-19) poses a particular threat to the elderly and seniors [4, 5]. Despite the fact that all age groups are equally at risk of COVID-19 infection, the development of serious complications and death in the elderly as a result of infection is 2.43 times higher than in young and middle-aged people [6, 12]. According to the Russian Association of Gerontologists and Geriatricians, mortality from COVID-19 in people 80 years and older can reach 15%, while in people under 50 years of age it is less than 0.5% [13, 14].

Currently, 16.5% of the country's residents are in the age group of 65 years and older. According to international criteria, the population is considered old if the share of people aged 65 years and older in the whole population exceeds 7% [7]. According to the Federal State Statistics Service, the population of the city of St. Petersburg is one of the oldest among the other subjects of the Russian Federation, where the proportion of people over 65 years of age is 17% (924,453 people out of 5,600,044 permanently residing citizens according to the Federal Service for State Statistics (Rosstat) for 2023) [8–10].

Among the main reasons for the increased vulnerability of elderly and senile people are the decrease in physiological reserves, general resistance and stability of the organism, and the presence of a number of chronic diseases. The most common comorbid conditions in the elderly, which adversely affect the course and outcome of the disease, are cardiovascular (coronary heart disease, arterial hypertension), endocrinological (diabetes mellitus), rheumatic diseases, chronic lung diseases and malignant neoplasms [11]. In addition, patients with two or more comorbidities may have a poorer prognosis than patients with a single comorbidity.

Elderly patients, due to decreased body reactivity, usually present with an atypical disease pattern without fever and cough. COVID-19 symptoms may be mild, not corresponding to the severity of the disease and the seriousness of the prognosis. From an immunological point of view, the peculiarities of the immune system of the elderly may contribute both to the deficiency of effector mechanisms necessary to combat viral pathogens and to the exacerbation of the inflammatory response, which may accelerate and intensify lung tissue damage. Thus, older individuals with comorbidities, despite the presence of mild symptoms, are at higher risk of developing a severe course of COVID-19, unpredictable and rapid deterioration. Consequently, patients older than 65 years of age should be classified as a high-risk group for COVID-19 mortality.

AIM

To evaluate the effectiveness of preventive hospitalization of patients over 65 years of age with COVID-19 in the St. Petersburg in the 2021.

MATERIALS AND METHODS

To assess the effectiveness of the measures taken during the pandemic, data on preventive hospitalization for the year 2021, organized in one of the largest districts of the St. Petersburg with up to half a million inhabitants, were analyzed. To realize this goal, a quarterly assessment was carried out. The following parameters were assessed:

- dynamics of COVID-19 morbidity and mortality among persons of all age groups and over 65 years of age;
- the number of emergency ambulance crew visits to persons over 65 years of age for COVID-19 symptoms and the number of their hospitalizations;
- dynamics of preventively hospitalized patients over 65 years of age and their mortality from COVID-19.

RESULTS AND DISCUSSION

Given the increased risk of mortality, preventive hospitalization can be an effective measure to prevent the development of severe or fatal disease in patients over 65 years of age with COVID-19. Preventive medicine is a direction in modern medical science and practice, at the head of which is the preservation of patient's health by preventing the development of various diseases and pathologies.

Its main objectives are:

- reduction of home mortality of persons over 65 years of age;
- reduction of daily mortality in hospital;
- reduction of hospital mortality of patients over 65 years of age;

- prevention of risks of complications from COVID-19 and related diseases in persons over 65 years of age;
- timeliness of medical care, including in emergency and urgent forms, in case of complications from COVID-19 and related diseases.

Preventive hospitalization of patients over 65 years of age with COVID-19 has been actively developed in the St. Petersburg in order to maximally prevent the development of complications and mortality in this category of patients.

The following target groups formed the basis of the present study:

- patients hospitalized for epidemiological indications (in the presence of COVID-19 contact);
- patients with clinical manifestations of COVID-19 (the mild form);
- patients with other manifestations of somatic diseases using a rapid test for COVID-19, including for decision-making on outpatient care to reduce the risks of COVID-19 infection and spread.

The decision on the need for hospitalization of these patients was made by a doctor based on a set of clinical and epidemiological data, taking into account the severity of the patient's condition (medium/severe course of the disease) and the requirements stipulated by the Order of the Ministry of Health of the Russian Federation No. 198n of 19.03.2020 "On the temporary procedure for organizing the work of medical organizations in order to implement measures to prevent and reduce the risks of COVID-19 spread".

In order to consider the potential advantage of preventive hospitalization, we analyzed for 2021 the dynamics of morbidity and mortality from COVID-19 among people of all age groups and over 65 years of age in particular, as well as data on hospitalizations of elderly people in medical organizations re-profiled to provide medical care to patients with COVID-19 in inpatient settings. The study of COVID-19 patients showed slight fluctuations in the number of patients in the age group over 65 years with COVID-19 throughout 2021, which is not typical of the total number of patients throughout 2021 (Fig. 1). According to the results, there was an increasing trend in the number of COVID-19 cases since the beginning of 2021,

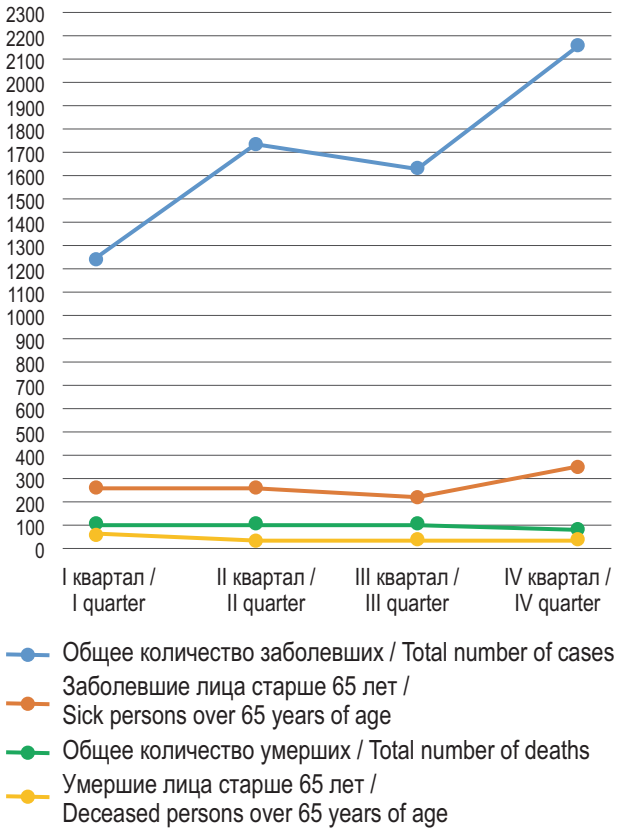

Fig. 1. Dynamics of morbidity and mortality of persons with COVID-19 of all age groups and persons over 65 years of age (2021)

Рис. 1. Динамика заболеваемости и смертности лиц с COVID-19 всех возрастных групп и лиц старше 65 лет (2021)

both among all age groups and among those over 65 years of age. For the I quarter, the number of patients was 1242, of whom over 65 years of age it was 258 people (20.8% of the total number of patients), for the II quarter it was 1738, of whom over 65 years was 260 (14.9%), for the III quarter it was 1634 people, the number of persons over 65 years of age was 225 people (13.8%), at the end of the IV quarter (data up to 28th of December) it was 2310 and 356 people respectively (15.4%). Thus, in general, absolute decrease in the share of the sick people aged 65 years and older made 5.4% (or 98 cases) by the IV quarter. The growth rate of the sick people over 65 years old in the IV quarter against the level of the I quarter was 27.5%.

The total number of deaths for the I quarter of 2021 was 108, for the II quarter it was 100, for the III quarter it was 96 and for the IV quarter it was 85. Among them, 56 persons over 65 years

of age (51.8% of all deaths) died in the I quarter, 31 (31.0%) in the II quarter, 27 (28.2%) in the III quarter and 24 (28.0%) in the IV quarter. Absolute decrease in the share of deaths over 65 years old by the IV quarter made 22.8% (or 32 deaths). In general, the rate of decrease in the IV quarter to the level of the I quarter reached 57.1%. The obtained data show that against the background of the increase in the number of patients since the beginning of 2021, there was a positive dynamics of reduction in the number of deaths from COVID-19, which can be indirectly regarded as an effective impact of vaccination among the population.

However, it is worth noting that despite the efforts made and the introduction of mandatory preventive hospitalization for the elderly, seniors and long-livers, the proportion of hospital admissions among those over 65 years of age is extremely low. In the I quarter of 2021 it was 30.6%, in the II quarter 31.5%, in the III quarter 44.8% and at the end of the IV quarter 41.3%. The data in absolute numbers is presented in Figure 2.

The development of this situation, in our opinion, is related to the distrust of patients and their relatives in the quality of treatment and care for the elderly, as well as to the prejudice towards the national health care system as a whole, which during the pandemic was caused by the widespread dissemination of negative information about its activities in the media and on the Internet. All of this facts could have caused a large number of refusals of hospitalization on the part of this category of patients. After analyzing the studies on predicting the risks associated with hospitalization of COVID-19 patients, we concluded that reliable clinical studies on this issue are currently lacking.

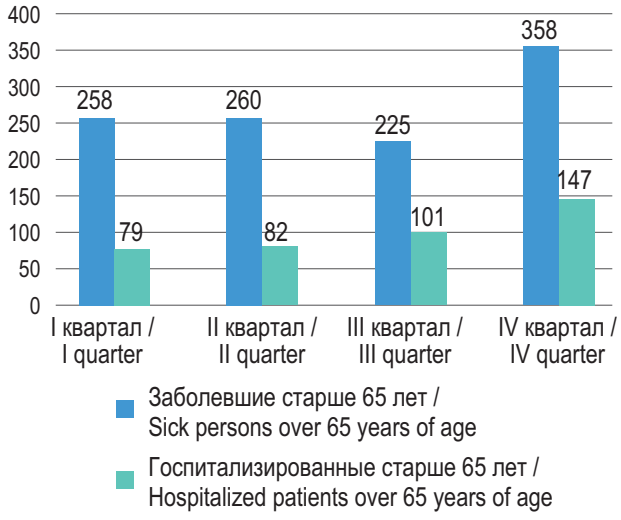

Fig. 2. Number of people over 65 years of age ill with COVID-19 and number of hospitalized people over 65 years of age among people with COVID-19 (2021)

Рис. 2. Количество заболевших COVID-19 лиц старше 65 лет и количество госпитализированных среди заболевших COVID-19 лиц старше 65 лет (2021)

We analyzed the data on emergency ambulance visits to persons over 65 years of age for COVID-19 symptoms and their preventive hospitalization, as well as the subsequent dynamics of mortality among this contingent for a more accurate assessment of the effectiveness of preventive hospitalization (Table 1).

The results show that since the beginning of 2021, the proportion of people preventively hospitalized by ambulance has been steadily increasing and reached 98% in the IV quarter, which is a good indicator.

In addition, there is a positive trend in the reduction of mortality among preventively hospitalized patients (Fig. 3). It was found that with an increase in the number of hospitalizations by 46.3% there was a decrease in the number of deaths by 73.7%.

The findings directly indicate that as the number of preventively hospitalized patients increased, the number of COVID-19 deaths gradually decreased throughout 2021. This fact confirms the importance and necessity of preventive hospitalization of older patients with COVID-19 in order to prevent complications and deaths.

CONCLUSION

1. The category of elderly citizens with suspected or confirmed COVID-19 is the most vulnerable to the rapid development and aggravated course of infection, which is confirmed by the high morbidity rate among this category of patients.

2. Hospitalization rates and morbidity rates are increasing in parallel with decreasing of the mortality in all age groups of patients.

3. COVID-19 coronavirus infection is a concept associated with increased mortality in persons over 65 years of age with associated pathological conditions such as cardiovascular disease, chronic respiratory disease, diabetes mellitus, cancer and others that exacerbate the course of viral infections.

Table 1

Analysis of the number of visits by emergency medical teams to persons over 65 years of age regarding symptoms of COVID-19 and their hospitalizations (2021)

Таблица 1

Анализ количества выездов бригад скорой медицинской помощи к лицам старше 65 лет по поводу симптомов COVID-19 и их госпитализаций (2021)

Период / Period Характеристика / Characteristics	I квартал / I quarter	II квартал / II quarter	III квартал / III quarter	IV квартал / IV quarter
Количество выездов бригад скорой медицинской помощи к лицам старше 65 лет по поводу симптомов COVID-19 / Number of visits by emergency medical teams to people over 65 years of age regarding symptoms of COVID-19	105	103	117	150
Количество госпитализированных лиц старше 65 лет с установленным и вероятным диагнозом COVID-19 / Number of hospitalized persons over 65 years of age with an established and primary diagnosis of COVID-19	79	82	101	147
Доля госпитализированных лиц старше 65 лет, доставленных бригадами скорой медицинской помощи, с установленным и вероятным диагнозом COVID-19, % / Proportion of hospitalized persons over 65 years of age delivered by ambulance teams with an established and primary diagnosis of COVID-19, %	75	80	86	98

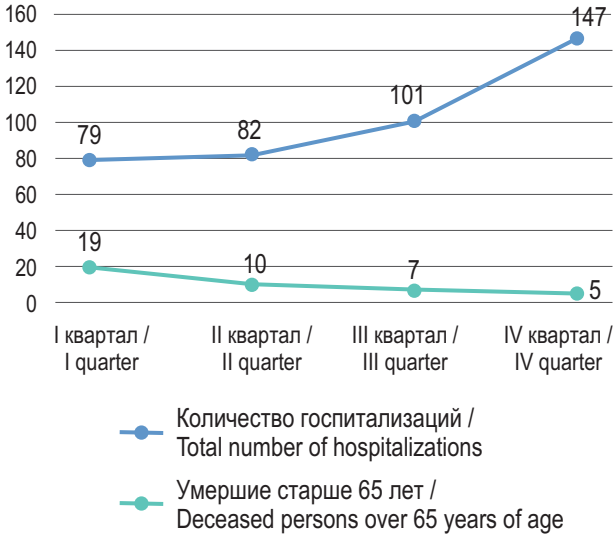

Fig. 3. Dynamics of the number of preventively hospitalized patients over 65 years old and their mortality from COVID-19 (2021)

Рис. 3. Динамика числа превентивно госпитализированных пациентов старше 65 лет и их смертности от COVID-19 (2021)

4. Even though the course of the disease is mild, preventive hospitalization is mandatory to prevent lightning COVID-19 and possible complications, as in hospital patients can receive a full range of not only drug treatment, but also oxygen therapy, 24-hour medical supervision.

5. The experience of the work done on the organization of hospitalization during the pandemic, as well as in the subsequent period, allows us to consider the tactics of preventive hospitalization of persons over 65 years of age as expedient in modern conditions, including outside the epidemic (pandemic).

Thus, the results of the study give the right to assert that preventive hospitalization of persons over 65 years of age is one of the ways to improve the quality and safety of medical care for this category of patients and makes it possible to largely avoid additional risk to their life and health.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

Competing interests. The authors declare that they have no competing interests.

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Конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

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REFERENCES

1. Akulin I.M., Belokolodova T.I. Development of the public health care system in the context of new challenges associated with the COVID-19 pandemic. Sbornik trudov XII ezhegodnaya nauchno-prakticheskaya konferenciya “Medicina i pravo v XXI veke”. Saint Petersburg; 2021:30–44. (In Russian).
2. Kalashnikov E.S., Shapovalova M.A. Comparative analysis of the outcome of hospitalization in an infectious diseases hospital among patients with COVID-19 in different age groups. In: Development of modern science: experience, problems, forecasts: Collection of articles from the VI International scientific and practical conference. Petrozavodsk; 2024:150–154. (In Russian).
3. Kulzhanova Sh.A., Sapar Zh.M., Turebaeva G.O. Analysis of fatal cases due to coronavirus infection COVID-19. Nauka i zdravookhraneniye. 2023;25(5):7–16. DOI: 10.34689/SH.2023.25.5.001. (In Russian).
4. Moiseeva I.E. Summary of World Health Organization guidance on the management of patients with coronavirus infection. Russian family doctor. 2020;24(2):19–30. DOI: 10.17816/RFD34884. (In Russian).
5. Ovakimyan K.V., Kuznecova O.Yu., Frolova E.V. et al. Novel coronavirus infection and elderly patients in primary health care settings. Russian family doctor. 2023;27(2):55–63. DOI: 10.17816/RFD366923. (In Russian).
6. Tkacheva O.N., Kotovskaya Yu.V., Aleksanyan L.A. et al. New coronavirus infection SARS-CoV-2 in elderly and senile patients: features of prevention, diagnosis and treatment. Cardiovascular therapy and prevention. 2020;19(3):127–150. (In Russian).
7. Meshkov D., Bezmelnitsyna L., Cherkasov S. A data management model for proactive risk management in healthcare. Advances in Systems Science and Applications. 2020;20(1):114–118. (In Russian).
8. Karailanov M.G., Miheev A.V., Prokin I.G. et al. Outpatient complementary technologies in primary care of domestic healthcare. Bulletin of the Russian Military Medical Academy. 2023;25(2):269–274. DOI: https://doi.org/10.17816/brmma192514. (In Russian).
9. Karailanov M.G., Fedotkina S.A., Malikova E.A. Organizational and methodological approach to assessing the effectiveness of primary health care at the present stage. In the world of scientific discoveries. 2016;8(80):63–80. (In Russian).
10. Karailanov M.G., Rusev I.T., Prokin I.G. et al. Rational use of hospital-replacement technologies in the provision of primary health care. Bulletin of the Russian Military Medical Academy. 2016;4(56):152–157. (In Russian).
11. Sycheva A.S., Malyavina M.A., Tebueva L.V. Features of the course of coronavirus infection COVID-19 in patients with comorbid pathology. Therapy. 2022;8,6(58):11–26. DOI 10.18565/therapy.2022.6.11-26. (In Russian).
12. Cheng Y., Luo R., Wang K. et al. Kidney disease is associated with in-hospital death of patients with COVID-19. Kidney International. 2020;97(5):829–838. DOI: 10.1016/j.kint.2020.03.005.
13. Guan W.J., Ni Z.Y., Hu Y. et al. Clinical Characteristics of Coronavirus Disease 2019 in China. The New England journal of medicine. 2020;382(18):1708–1720. DOI: 10.1056/NEJMoa2002032.
14. Lithander F.E., Neumann S., Tenison E. et al. COVID-19 in older people: a rapid clinical review. Age and ageing. 2020;49(4):501–515.

ЛИТЕРАТУРА

1. Акулин И.М., Белоколодова Т.И. Развитие государственной системы здравоохранения в условиях новых вызовов, связанных с пандемией COVID-19. Сборник трудов XII ежегодная научно-практическая конференция «Медицина и право в XXI веке». СПб., 2021:30–44.
2. Калашников Е.С., Шаповалова М.А. Сравнительный анализ исхода госпитализации в инфекционном госпитале среди пациентов с ковид-19 в разных возрастных группах. В кн.: Развитие современной науки: опыт, проблемы, прогнозы: Сборник статей VI Международной научно-практической конференции. Петрозаводск; 2024:150–154.
3. Кулжанова Ш.А., Сапар Ж.М., Туребаева Г.О. Анализ летальных случаев при коронавирусной инфекции COVID-19. Наука и здравоохранение. 2023;25(5):7–16. DOI: 10.34689/SH.2023.25.5.001.
4. Моисеева И.Е. Краткий обзор руководства Всемирной организации здравоохранения по ведению пациентов с коронавирусной инфекцией. Российский семейный врач. 2020;24(2):19–30. DOI: 10.17816/RFD34884.
5. Овакимян К.В., Кузнецова О.Ю., Фролова Е.В. и др. Новая коронавирусная инфекция и пожилые пациенты в условиях первичной медико-санитарной помощи. Российский семейный врач. 2023;27(2):55–63. DOI: 10.17816/RFD366923.
6. Ткачева О.Н., Котовская Ю.В., Алексанян Л.А. и др. Новая коронавирусная инфекция SARS-CoV-2 у па-

циентов пожилого и старческого возраста: особенности профилактики, диагностики и лечения. Согласованная позиция экспертов Российской ассоциации геронтологов и гериатров. Кардиоваскулярная терапия и профилактика. 2020;19(3):127–150.
7. Meshkov D., Bezmelnitsyna L., Cherkasov S. A data management model for proactive risk management in healthcare. Advances in Systems Science and Applications. 2020;20(1):114–118.
8. Карайланов М.Г., Михеев А.В., Прокин И.Г., Апчел А.В. Амбулаторно-дополняющие технологии в первичном звене отечественного здравоохранения. Вестник Российской Военно-медицинской академии. 2023;25(2):269–274. DOI: https://doi.org/10.17816/brmma192514.
9. Карайланов М.Г., Федоткина С.А., Маликова Е.А. Организационно-методический подход к оценке эффективности первичной медико-санитарной помощи на современном этапе. В мире научных открытий. 2016;8(80):63–80.
10. Карайланов М.Г., Русев И.Т., Прокин И.Г., Пильник Н.М., Борисов Д.Н., Яковлев А.Г. Рациональное использование стационарозамещающих технологий при оказании первичной медико-санитарной помощи. Вестник Российской военно-медицинской академии. 2016;4(56):152–157.
11. Сычева А.С., Малявина М.А., Тебуева Л.В. и др. Особенности течения коронавирусной инфекции COVID-19 у пациентов с коморбидной патологией. Терапия. 2022;8,6(58):11–26. DOI: 10.18565/therapy.2022.6.11-26.
12. Cheng Y., Luo R., Wang K. et al. Kidney disease is associated with in-hospital death of patients with COVID-19. Kidney International. 2020;97(5):829–838. DOI: 10.1016/j.kint.2020.03.005.
13. Guan W.J., Ni Z.Y., Hu Y. et al. Clinical Characteristics of Coronavirus Disease 2019 in China. The New England journal of medicine. 2020;382(18):1708–1720. DOI: 10.1056/NEJMoa2002032.
14. Lithander F.E., Neumann S., Tenison E. et al. COVID-19 in older people: a rapid clinical review. Age and ageing. 2020;49(4):501–515.