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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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HEALTH-RELATED QUALITY OF LIFE OF POST-COVID-19 PATIENTS IN KAZAKHSTAN

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Abstract.

Background: The COVID-19 pandemic has had a significant impact on the physical and mental health of populations worldwide. Particular attention has been paid to the study of the long-term consequences of infection, known as "long-term COVID-19", which can persist for months after the acute period of illness.

Aim: The aim of the study is to evaluate HRQoL in patients with COVID-19 sequelae.

Methods: A cross-sectional, observational study was conducted in the Republic of Kazakhstan among COVID-19 survivors. The data collection period covered the period from April 24 to December 25, 2024. A cross-sectional study was conducted in Abay region involving individuals with persistent symptoms approximately one month after COVID-19 infection or hospital discharge, in which all patients underwent clinical evaluation.

Results: Out of 257 patients with post-COVID-19 syndrome, 209 (81.3%) were hospitalized during the acute phase. No statistically significant differences were observed between hospitalized and non-hospitalized patients in terms of age, sex, BMI, or blood pressure ($p > 0.05$). Neurological symptoms such as paresthesias (43.5% vs. 29%, $p = 0.0001$) and dizziness (65.5% vs. 35%, $p = 0.003$) were more prevalent among non-hospitalized patients. In contrast, hospitalized patients more frequently reported dyspnea and muscle weakness, although without statistical significance. Hospitalization was significantly associated with the presence of diabetes mellitus (15.4 % vs. 4.35%, $p = 0.0001$), and obesity (22% vs. 4.2%, $p = 0.004$), indicating a strong link between metabolic comorbidities and severe COVID-19. Quality of life assessment using the SF-36 questionnaire revealed greater physical limitations in hospitalized patients ($p = 0.005$), while they reported significantly better mental health scores compared to non-hospitalized patients (70.46 ± 22.42 vs. 56.38 ± 28.08, $p = 0.001$).

Conclusion: Post-COVID-19 syndrome significantly affects patients' physical and mental health in Kazakhstan, regardless of the severity of the initial infection. Hospitalized patients reported more physical limitations but better mental health outcomes. These findings highlight the need for early detection and multidisciplinary rehabilitation to improve quality of life and reduce the burden on the healthcare system.

Key words. Post-COVID syndrome, long COVID, health-related quality of life.

Introduction.

Coronavirus infection (COVID-19), caused by the SARS-CoV-2 virus, is an acute respiratory tract infection that caused one of the largest pandemics of modern times, with significant morbidity and mortality worldwide. According to observational data, approximately 80% of patients had mild to moderate disease, while about 5% of cases were characterized by the development of critical condition [1]. The disease is characterized by its ability to spread from person to person and is caused by the SARS-CoV-2 coronavirus, which causes severe acute respiratory syndrome [2-4].

In addition to the acute course of the disease, increasing attention is paid to its long-term consequences, known as post-COVID-19 syndrome or "long-term COVID-19" [5]. Most patients with COVID-19 survive the disease without subsequent complications, but some continue to experience residual symptoms after recovery and some develop new clinical manifestations [6]. Some of the most common symptoms of post-COVID syndrome include fatigue, headache, decreased concentration, hair loss, dyspnea, myalgia, and arthralgia [7]. Numerous studies have confirmed that COVID-19 has long-lasting effects on various body systems including respiratory, cardiovascular, gastrointestinal, and nervous systems [8]. PCOS presents with multiple symptoms affecting different organs and systems, which requires long-term follow-up and sometimes repeated hospitalization, most patients have comorbidities - cardiovascular, diabetes, obesity, oncology and chronic kidney disease [9,10]. The aim of this study was to evaluate HRQoL in patients with COVID-19 sequelae.

Materials and Methods.

Study design: A cross-sectional, observational study was conducted in the Republic of Kazakhstan among COVID-19 survivors. The data collection period covered the period from April 24 to December 25, 2024. A cross-sectional study was conducted in Abay region involving individuals with persistent symptoms approximately one month after COVID-19 infection or hospital discharge, in which all patients underwent clinical evaluation. The number of respondents was 257 (non-hospitalized - 49, hospitalized -209).

The target population included individuals with persisting symptoms approximately one month after COVID-19 infection or hospital discharge.

Ethics statement: Before starting the study, all documents, including the research protocol and data collection questionnaires, underwent expert review and received positive approval from the Local Ethics Commission of the NJSC Semey Medical University, Minutes of Meeting No. 2 of 12.12.2023. Patients were included in the study only after they received full information about it and gave written voluntary consent to participate.

Participant selection: Patient recruitment began from April 24, 2024 to December 25, 2024. Data were collected using an

online survey platform (Google Forms). The questionnaire was sent electronically to eligible participants through professional networks and institutional contacts. An informed consent form was placed on the first page of the survey. Only those participants who gave consent were allowed to complete the questionnaire. Confidentiality and anonymity of participants were strictly maintained throughout the study.

Inclusion criteria: Adult patients, regardless of sex, aged 18 to 75 years with persistent symptoms or sequelae of COVID-19 infection confirmed by polymerase chain reaction or serologic testing were included in this study. We included patients who consented to participate in the study by signing an informed consent form.

Exclusion Criteria: Patients with clinically unstable clinical presentation (decompensated congestive heart failure, fever, systemic arterial hypertension, or acute rheumatoid arthritis), psychiatric and/or psychological disorders that impede comprehension, musculoskeletal diseases that prevent physical activity, and patients with tumor disease were excluded from the study. Patients unable to perform the proposed functional tests were also excluded.

Measurement tools: To assess health-related quality of life (HRQoL) in patients with post-COVID syndrome, we used the standardized SF-36 questionnaire, which is a validated universal multicomponent instrument widely used in clinical and epidemiological studies [11]. The questionnaire includes 36 items grouped into eight domains: physical functioning, limitations due to physical condition, pain severity, general health perception, vitality, social functioning, emotional limitations, and mental health. These parameters form two integral components - physical and mental.

The calculation of score values was carried out according to the established SF-36 methodology, with the transformation of indicators for each scale into a range from 0 to 100 points, where higher values reflect a higher level of subjectively perceived health and, accordingly, a better quality of life [12,13].

The questionnaire was translated into Kazakh and Russian, and cultural and linguistic adaptation was carried out according to internationally recognized standards to ensure consistency with the local context.

Statistical Analysis:

The Kolmogorov-Smirnov test was used to test the normality of the distribution of the variables under study. For intragroup comparisons, Student's t-test for paired samples with parametric distribution or Mann-Whitney U-test for variables with nonparametric distribution was used. Intergroup comparisons were performed using one-factor analysis of variance (ANOVA. For intergroup comparisons of variables with nonparametric distribution, the Kraskell-Wallis test was used, and pairwise comparisons (if the null hypothesis was rejected) were performed using the Mann-Whitney U-criterion. Pearson's correlation coefficient for samples with parametric distribution and Spearman's correlation coefficient for samples with nonparametric distribution were used to assess intragroup correlations. All analyses were performed using SPSS version 24.0 for Windows (Chicago, IL, USA). The significance level for all analyses was 5%.

Results.

Table 1 presents sociodemographic and clinical-anamnestic characteristics of patients with post-COVID syndrome distributed according to the fact of hospitalization experienced. Of the total participants, 18.7% (N=48) were not hospitalized inpatients, whereas 81.3% (N=209) were hospitalized.

In comparative analysis, there were no statistically significant differences in sex ($p=0.304$), ethnicity ($p = 0.220$), age ($p = 0.123$), body weight ($p = 0.289$), body mass index (BMI; $p = 0.142$), systolic (CAD) and diastolic (DBP) blood pressure ($p > 0.05$ for all parameters). The mean duration of hospitalization was 7.48 ± 2.34 days and showed a statistically significant difference ($p = 0.001$), while data on intensive care unit (ICU) stay were not available. Oxygen therapy was used in 9.0% of hospitalized patients and in 8.7% of non-hospitalized patients, but the differences did not reach the level of statistical significance ($p =0.086$).

Thus, the main distinguishing characteristic between the compared groups was the duration of hospitalization, whereas other parameters including sex, age, anthropometry and hemodynamics had a similar distribution.

Table 2 shows the distribution of the main symptoms observed in patients with post-COVID syndrome, depending on the fact of hospitalization. The comparison was made between two groups: non-hospitalized (n=48) and hospitalized (n=209). The most common complaints in both groups of patients were weakness, headache, sleep disturbances, dyspnea, paresthesias, and cognitive impairment.

Symptoms significantly more common in non-hospitalized patients included: Paresthesias (43.5% vs. 29%, $p = 0.0001$), Dizziness (65.5% vs. 35%, $p = 0.003$).

Other neuropsychological disorders such as memory deficits (64.6% vs. 34.9%) and attention deficits (17.4% vs. 13%) were more frequent in the group without hospitalization, but the differences did not reach statistical significance.

Muscle weakness (77%) and dyspnea (68%) were more common in hospitalized patients, but no statistically significant differences were also recorded ($p>0.05$). Symptoms such as anosmia, agenesis, arthralgia, tremor, tachycardia and myalgia had similar frequency in both groups.

The data obtained demonstrate that the severity of the disease, determined by the need for hospitalization, does not always correlate with the severity or frequency of neurological and somatic symptoms in the post-COVID syndrome. In particular, some sensory and vestibular disorders are more frequent in patients who did not undergo hospitalization, which may indicate a different pathogenetic mechanism of post-COVID syndrome manifestations in these groups.

Table 3 presents the prevalence of major comorbidities in patients before coronavirus infection, divided by hospitalization. The analysis included 48 patients who did not require hospitalization and 209 hospitalized patients with post-COVID syndrome.

The results showed that the most common comorbid conditions in the study cohort were diabetes mellitus, obesity, and dyslipidemia. Diabetes mellitus was significantly more common in the hospitalized group (15.4% vs. 4.35%; $p=0.0001$), confirming the literature data on its role as an independent risk factor for poor prognosis in coronavirus infection.

Table 1. *Sociodemographic and clinical characteristics presented by post-COVID-19 patients.*

Variables	**Not Hospitalized (n = 48)**	**Hospitalized (n = 209)**	**P**
Sex			0.304
Male	25 (52.17%)	118 (56.67%)	
Feminine	23 (47.83%)	91(43.33%)	
Nationality			0.22
Kazakh	17 (34.78%)	99 (47.55%)	
Russian	23(47.83%)	80 (37.9%)	
Other	8 (17.39%)	30 (14.50%)	
Age (years)	48.65 ± 15.25	50.37 ± 12.97	0.123
Weight (kg)	73.61± 21.02	75.31 ± 13.3	0.289
BMI	28.43 ± 8.34	30.64 ± 5.8	0.142
SBP (mmHg)	125.45 ± 17.57	129.21± 10.34	0.168
DBP (mmHg)	81.63 ± 13.21	80.00 ± 10.39	0.101
Hospitalization time (days)	N/A	7.48 ± 2.34	0.001
ICU stay (days)	N/A	N/A	
Oxygen therapy	4 (8.70%)	19 (9%)	0.086

Table 2. *Main symptoms presented by post-COVID-19 patients.*

Variables	**Not Hospitalized (n = 48)**	**Hospitalized (n = 209)**	**p**
Ageusia	8 (17.39%)	46 (22.0%)	0.16
Anosmia	10 (21.74%)	42 (20.0%)	0.364
Changes in sleep	31 (65.22%)	102 (49.0%)	0.168
Visual changes	8 (17.39%)	43 (16.0%)	0.172
Arthralgia	10 (21.74%)	56 (27.0%)	0.403
Headache	29 (60.87%)	94 (45.0%)	0.927
Concentration deficit	8 (17.39%)	27 (13.0%)	0.205
Memory deficit	31 (64.6%)	73 (34.9%)	0.426
Balance deficit	19 (39.13%)	88 (42.0%)	0.536
Dyspnea	35 (73.91%)	142 (68.0%)	0.205
Muscle weakness	29 (60.87%)	161 (77.0%)	0.824
Myalgia	25 (52.17%)	91 (44.0%)	0.511
Paresthesia	20 (43.48%)	60 (29.0%)	0.0001
Tachycardia	25 (52.17%)	98 (47.0%)	0.926
Tremors	19 (39.13%)	77 (37.0%)	0.237
Dizziness	31 (65.52%)	73 (35.0%)	0.003
Cough	13 (26.09%)	111 (53.0%)	0.363

Table 3. *Main comorbidities presented by patients prior to COVID-19 infection.*

Variables	**Not Hospitalized (n = 48)**	**Hospitalized (n= 209)**	**p**
Asthma	2 (4.35%)	6 (3%)	0.142
Depression	4 (8.7%)	17 (8%)	0.104
Arterial hypertension	11 (22.9%)	74 (35.4%)	0.097
Dyslipidemia	8 (17.39%)	20 (10%)	0.168
Diabetes Mellitus	2 (4.35%)	32 (15.4%)	0.0001
Chronic Obstructive Pulmonary Disease	2 (4.35%)	4 (2%)	0.154
Hypothyroidism	3 (6.3%)	15 (7.2%)	0.82
Hepatic steatosis	4 (8.7%)	10 (5%)	0.311
Obesity	2 (4.2%)	46 (22%)	0.004

Table 4. *Health-related quality of life in post-COVID-19 patients.*

Variables	Not Hospitalized (n = 48)	Hospitalized (n = 209)	p
SF-36 (0–100)			
Functional capacity	49.23 ± 28.42	36.33 ± 25.7	0.141
Limitation by physical aspects	20.32 ± 26.3	28.38 ± 38.81	0.005
Pain	55.22 ± 24.3	62.73 ± 29.74	0.06
General health status	47.85 ± 19.13	58.53 ± 15.35	0.152
Vitality	48.11 ± 23.12	55.29 ± 21.33	0.105
Social aspects	46.37 ± 30.44	53.13 ± 27.18	0.197
Emotional aspects	42.64 ± 39.54	52.62 ± 32.63	0.137
Mental health	56.38 ± 28.08	70.46 ± 22.42	0.001

Obesity also had a statistically significant association with the need for hospitalization (22.0% vs. 4.2%; p=0.004), which may be related to systemic chronic inflammation and impaired ventilation and respiratory function in this category of patients.

Other comorbid conditions, including asthma, COPD, depression, dyslipidemia, and fatty liver hepatosis, did not demonstrate statistically significant differences between groups ($p > 0.05$), which may indicate their lower prognostic significance in the context of COVID-19 course severity in this sample.

Thus, these results underscore the key role of metabolic disorders and cardiovascular pathology in the formation of a more severe clinical course of COVID-19 requiring hospitalization. These data correlate with international studies and can be used in the development of clinical algorithms for risk stratification.

Table 4 illustrates indicators reflecting health-related quality of life (HRQoL) in patients with post-COVID syndrome, assessed using the standardized SF-36 questionnaire. Comparative analysis was performed between two groups: patients who did not require hospitalization (n=48) and patients who underwent hospitalization (n=209).

The SF-36 questionnaire includes eight domains, each rated on a scale from 0 to 100, where higher values correspond to better quality of life. The analysis demonstrated the following results: functional capacity was higher in non-hospitalized patients (49.23 ± 28.42) compared to hospitalized patients (36.33 ± 25.7), but the difference did not reach statistical significance ($p = 0.141$).

In contrast, limitations due to physical condition were more pronounced in hospitalized patients (28.38 ± 38.81), and the difference was statistically significant (p=0.005), indicating a more pronounced impairment in physical activity after a severe course of COVID-19.

Pain scale showed a tendency for better values in hospitalized patients (62.73 ± 29.74 vs. 55.22 ± 24.3), but the difference was not statistically significant (p=0.06). General health status, vitality, social and emotional aspects were also slightly higher in hospitalized patients, but no statistically significant differences were found for these indicators ($p > 0.05$).

A significant difference was noted on the mental health scale: this index was significantly higher in hospitalized patients (70.46 ± 22.42 vs. 56.38 ± 28.08; p=0.001), which may indicate either compensatory psychological mechanisms or better posthospital follow-up and support.

Thus, the data suggest multidirectional trends in patients' perceived quality of life depending on the severity of COVID-19. Although hospitalization was associated with greater physical limitations, these patients had higher scores on the mental health scale and other subjective aspects of quality of life.

Discussion.

The present study assessed the impact of COVID-19 on health-related quality of life (HRQoL) in patients with post-covid syndrome in the Republic of Kazakhstan. The results revealed both physical and psychoemotional effects of the disease that persist for months after the acute phase of infection.

In accordance with the literature, our results confirmed that post-covid syndrome is characterized by multiple symptoms, including muscle weakness, dyspnea, cognitive impairment, paresthesias, and dizziness [14,15]. Notably, sensory and vestibular disturbances such as paresthesias and dizziness were more common in patients who were not hospitalized. Dizziness was significantly more common among non-hospitalized patients compared to those who were hospitalized (65.5% vs. 35.0%, p= 0.003), suggesting that vestibular manifestations may develop independently of acute disease severity. This may indicate differences in the pathogenesis of post-COVID syndrome manifestations depending on the severity of the acute illness, which has also been noted in previous studies [16].

HRQoL analysis using the SF-36 questionnaire showed that hospitalized patients showed significantly worse scores on the physical limitations scale, indicating a more pronounced decrease in physical activity. At the same time, it was unexpected to find higher scores on the mental health scale in this group, which can probably be related to better posthospitalization care, rehabilitation, and psychological support provided to this category of patients. This observation may be associated with factors such as better access to post-hospitalization care, rehabilitation services, or psychological support, and it could also reflect a potential “survivor effect.” Nevertheless, these explanations should be regarded as tentative, as the study design does not allow for definitive conclusions. Similar findings were reported by Ayoubkhani et al (2021), who emphasized the importance of a multidisciplinary approach in the rehabilitation of postconvulsive patients [17].

In addition, the study found a statistically significant association between the presence of metabolic disorders (obesity, diabetes mellitus) and the need for hospitalization, which is consistent

with international data on the role of these conditions as risk factors for a severe course of COVID-19 [18].

In contrast, hospitalized patients were more likely to have severe physical limitations, probably related to the severe course of acute COVID-19, hypoxemia, prolonged immobilization, and the development of post-intensive syndrome [19], [20]. However, they had better scores on the SF-36 mental health scale compared to the non-hospitalized, which may be due to better access to psychological support programs and the "survivor" effect described by Huang et al. [21].

This study has several limitations that warrant consideration. The recruitment strategy relying on an online survey distributed through expert networks and facility contacts may have introduced selection bias, favoring participants with higher education levels or greater internet proficiency, thereby limiting the representativeness of the sample. In addition, the cross-sectional design precludes the establishment of causal inferences between post-COVID-19 syndrome and the observed health-related quality of life outcomes. Furthermore, the reliance on self-reported data may be subject to recall and reporting biases, potentially affecting the accuracy of symptom prevalence estimates. Despite these constraints, the study contributes valuable evidence on the health-related quality of life of post-COVID-19 patients in Kazakhstan.

Our results underscore the need for comprehensive postvascular rehabilitation programs with emphasis on physical activity restoration as well as psycho-emotional support, especially for patients who have undergone a severe course of the disease.

Conclusion.

The study demonstrated that post-CoVID-19 syndrome has a multifaceted impact on the health and quality of life of patients in Kazakhstan. Regardless of the severity of the course of acute COVID-19, most patients continue to experience physical and psycho-emotional impairment months after recovery. Patients who underwent hospitalization were characterized by more pronounced physical limitations but had better scores on the mental health scale.

The findings emphasize the need for early detection and comprehensive rehabilitation of patients with post-COVID syndrome, including medical, psychological, and social support. The introduction of multidisciplinary care programs will improve quality of life and reduce the burden of post-COVID syndrome sequelae on the health care system.

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Conflicts of Interest.

The authors declare that they have no competing interests.

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