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HOSPITAL OUTCOMES OF PATIENTS WITH COVID-19 OF THE SEMEY REGIONAL INFECTIOUS HOSPITAL

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Abstract

Introduction. The coronavirus disease 2019 (COVID-19) outbreak, which originated in Wuhan, China, has now spread in all countries of the world. On the end march of 2020 globally, at least 7900 deaths have been directly attributed to COVID-19. All people who died from COVID-19 in the world were aged 68 to 88 years.

The objective of this study was to clear the hospital outcomes of patients with Covid-19 of the Semey Regional Infectious Hospital for two months of 2021.

Methods. The study included 558 patients who were observed at the Semey Infectious Hospital from July 1 to September 30 of 2021. Data are presented as the means ± standard deviation or as frequencies and percentage. The incidence rates were calculated as the number of cases per 100000 person-years of follow-up and 95% CI. Bivariate associations between independent variables and survival were studied using Kaplan–Meier curves and compared with log-rank tests.

Results. The main in-hospital outcome of patients was improvement (90,5%), pathients without changes were (0,4%), death was registered in 51 (9,1%) cases. Patients who died in-hospital period were predominantly female (58,8%), mean age 66,4 (±13,6%) years. The incidence rate was higher in men (9545,5 per 100,000 population.), in other nationalities (12500,0 per 100,000 population). The significant difference the mean follow-up time between men and women (p=0,032), between age group (p=0,009), and between nationalty (p=0,015) was determined.

Conclusion. The main in-hospital outcome in patients was improvement. Patients who died in-hospital period were predominantly female, mean age 66,4 years old. Mortality rate was higher in men, in other nationalty and age group patients older 70 years. The significant difference the mean follow-up time between men and women, between age group, and nationalty was defined.

***Key words**. COVID-19, outcome, incidence rate, morbidity, mortality.*

Резюме

ИСХОДЫ ЛЕЧЕНИЯ ПАЦИЕНТОВ С COVID-19 В ОБЛАСТНОЙ ИНФЕКЦИОННОЙ БОЛЬНИЦЕ Г. СЕМЕЙ

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Введение. Вспышка коронавирусной болезни 2019 года (COVID-19), которая возникла в Ухане, Китай, в настоящее время распространилась во всех странах мира. На конец марта 2020 года во всем мире, по меньшей

мере, 7900 смертей были напрямую связаны с COVID-19. Все люди, умершие от COVID-19 в мире, были в возрасте от 68 до 88 лет.

Целью данного исследования было изучение исходов госпитализации пациентов с Covid-19 в областной инфекционной больницы г.Семей за два месяца 2021 года.

Методы. В исследование были включены 558 пациентов, которые наблюдались в Инфекционной больнице г.Семей с 1 июля по 30 сентября 2021 года. Данные представлены в виде средних значений и стандартного отклонения или в виде частот и процентов. Показатели заболеваемости были рассчитаны как число случаев на 100000 населения и 95% ДИ. Выживаемость изучалась с использованием кривых Каплана–Мейера и сравнивались с логарифмическими критериями.

Результаты. Основным госпитальными исходами пациентов было улучшение (90,5%), без изменения (0,4%), смерть зарегистрирована в 51 (9,1%) случаях. Пациенты, умершие в стационаре, были преимущественно женского пола (58,8%), средний возраст 66,4 (±13,6%) лет. Показатель заболеваемости был выше у мужчин (9545,5 на 100 000 населения), у представителей других национальностей (12500,0 на 100 000 населения). Была определена достоверная разница в среднем времени наблюдения между мужчинами и женщинами (p=0,032), между возрастными группами (p=0,009) и между национальностями (p=0,015).

Выводы. Основным результатом пребывания пациентов в стационаре было улучшение. Пациенты, умершие в стационаре, были преимущественно женского пола, средний возраст 66,4 года. Показатель смертности был выше у мужчин, у пациентов других национальностей и возрастных групп старше 70 лет. Была определена значительная разница в среднем времени наблюдения между мужчинами и женщинами, между возрастными группами и национальностью.

***Ключевые слова**. COVID-19, исход, показатель заболеваемости, заболеваемость, смертность.*

Түйіндеме

СЕМЕЙ Қ. ОБЛЫСТЫҚ ЖҰҚПАЛЫ АУРУЛАР АУРУХАНАСЫНДА COVID-19 АУЫРҒАН ПАЦИЕНТТЕРДІ ЕМДЕУ НӘТИЖЕЛЕРІ

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Кіріспе. Қытайдың Ухань қаласында пайда болған 2019 жылғы коронавирус ауруы (COVID-19) қазіргі уақытта әлемнің барлық елдеріне таралды. 2020 жылдың наурыз айының соңында бүкіл әлемде кем дегенде 7900 өлім COVID-19-мен тікелей байланысты болды. Әлемде COVID-19-дан қайтыс болған адамдардың барлығы 68-ден 88 жасқа дейін болды.

Аталған зерттеудің мақсаты 2021 жылдың екі айында Семей қаласының Облыстық жұқпалы аурулар ауруханасына Covid-19 бар науқастарды емдеуге жатқызу нәтижелерін зерттеу болды.

Әдістері. Зерттеуге 2021 жылғы 1 шілде мен 30 қыркүйек аралығында Семей қаласының жұқпалы аурулар ауруханасында қаралған 558 пациент қосылды. Деректер орташа мәндер және стандартты ауытқу түрінде немесе жиіліктер мен пайыздар түрінде ұсынылған. Ауру көрсеткіштері 100000 адамға шаққандағы жағдайлардың саны және 95% СА ретінде есептелді. Өмір сүру Каплан-Мейер қисықтарын қолдана отырып зерттелді және логарифмдік өлшемдермен салыстырылды.

Нәтижелері. Пациенттердің негізгі госпитальдық нәтижелері жақсару болды (90,5%), өзгеріссіз (0,4%), өлім 51 (9,1%) жағдайда тіркелді. Стационарда қайтыс болған пациенттер көбінесе әйел жынысты (58,8%), орташа жасы 66,4 (±13,6%) жас. Сырқаттану көрсеткіші ерлерде жғары болды (100 000 тұрғынға 9545,5), басқа ұлт өкілдерінде (100 000 тұрғынға 12500,0) болды. Ерлер мен әйелдер арасындағы (p=0,032), жас топтары арасындағы (p=0,009) және ұлттар арасындағы (p=0,015) орташа бақылау уақытының нақты айырмашылығы анықталды.

Тұжырымдар. Науқастардың ауруханада болуының негізгі нәтижесі жақсару болды. Ауруханада қайтыс болған науқастар негізінен әйелдер болды, орташа жасы 66,4 жыл. Өлім көрсеткіші ер адамдарда, басқа ұлттардың пациенттерінде және 70 жастан асқан жас топтарында жоғары болды. Ерлер мен әйелдер арасындағы, жас топтары мен ұлт арасындағы орташа бақылау уақытының айтарлықтай айырмашылығы анықталды.

***Түйінді сөздер**. COVID-19, аурудың нәтижесі, көрсеткіші, ауру, өлім.*

Библиографическая ссылка:

Saidualiev D.N., Balkhan A.S., Murzabaev M.G., Kumarbekova A.D., Abdiganiev A.A., Aktymbaeva N.B., Maukayeva S.B., Shalgumbayeva G.M. Hospital outcomes of patients with COVID-19 of the Semey regional infectious hospital // *Nauka i Zdravookhranenie* [Science & Healthcare]. 2022, (Vol.24) 3, pp. 24-29. *doi 10.34689/SH.2022.21.3.003*

Сайдуалиев Д.Н., Балхан А.С., Мурзабаев М.Ғ., Құмарбекова Ә.Д., Абдиганиев А.А., Ақтымбаева Н.Б., Маукаева С.Б., Шалгумбаева Г.М. Исходы лечения пациентов с COVID-19 в Областной инфекционной больнице г. Семей // Ғылым және Денсаулық сақтау. 2022. 3 (Т.24). Б. 24-29.*Doi10.34689/SH.2022.24.3.003*

Сайдуалиев Д.Н., Балхан А.С., Мурзабаев М.Ғ., Құмарбекова Ә.Д., Абдиганиев А.А., Ақтымбаева Н.Б., Маукаева С.Б., Шалгумбаева Г.М. Семей қ. Облыстық жұқпалы аурулар ауруханасында COVID-19 ауырған пациенттерді емдеу нәтижелері // Наука и Здравоохранение. 2022. 3(Т.24). С. 24-29. *doi 10.34689/SH.2022.24.3.003*

Introduction

The coronavirus disease 2019 (COVID-19) outbreak, which originated in Wuhan, China, has now spread to 192 countries and administrative regions infecting nearly 800,000 individuals of all ages as of 31 March 2020 [2]. The World Health Organization (WHO) announced that the official name of the disease caused by SARS-CoV-2 is Corona Virus Disease-19 (COVID-19) [9]. Though most infected individuals exhibit mild symptoms including fever, upper respiratory tract symptoms, shortness of breath, and diarrhea [8], or are asymptomatic altogether [1], severe cases of infection can lead to pneumonia, multiple organ failure, and death [3].

Globally, at least 7900 deaths have been directly attributed to COVID-19 [2], and this number is expected to rise with the ongoing epidemic. The situation of the rapid spread of COVID-19 in the world confirmed that it is a very aggressive virus, quickly and easily transmitted and the most dangerous for elderly people with weakened health: all people who died from COVID-19 in the world were aged 68 to 88 years, and the youngest victim suffered from cancer. The spread of SARS-CoV-2 also showed that there are no borders for the virus, and a new local center can arise anywhere. Despite geographical proximity to China and evolving international relations, in the early start of pandemia Kazakhstan was among the countries less affected by COVID-19 [14].

The worldwide case fatality rate of 3.4% of COVID19 now exceeds that from seasonal influenza [12]. Reasons of death were acute respiratory distress syndrome (ARDS), acute respiratory failure, coagulopathy, septic shock, and metabolic acidosis [13]. Cardiovascular complications of COVID-19 comprise arrhythmias, acute cardiac injury, and shock, and have been reported in 7–17% of hospitalized patients [11]. The estimated case fatality rate in Italy was 7.2% [7], while it was 0.9% in South Korea [4] and 2.3% in China [13].Case fatality was highest in those aged who was elder than 80 years (14.8% in China, 20.2% in Italy) and in patients with pre-existing conditions including cardiovascular disease, diabetes mellitus, chronic respiratory disease, hypertension, and cancer [10]. Among all comorbidities, cardiovascular disease in the elderly was most consistently associated with adverse outcomes, as a case fatality rate of 10.5% has been reported in this high-risk population [13].

The objective of this investigation was to study the hospital outcomes of patients with Covid-19 of the Semey Regional Infectious Hospital for two months of 2021.

Methods. The study included 558 patients who were observed at the Semey Infectious Hospital from July 1 to September 30 of 2021. We chose this period due to increasing of morbidity of COVID-19 in this time in Kazakhstan. The data was received from the electronic patient registry wich entitled “Electronic In-patient Registry” (EIPR) that comprises health records of all patients hospitalized to healthcare facilities of Kazakhstan. It is presented as a unified and centralized information database that stores all data on the record-by-record basis and enables access to relevant statistical information by provision of analytical reporting at the level of in-patient care.

The study included all deaths (51 cases) for study period. Analyses were performed with SPSS. IBM SPSS Statistics for Windows, Version 20.0 (SSMU Semey city). 05 were considered statistically significant. Data are presented as the means ± standard deviation or as frequencies and percentage. The incidence rates were calculated as the number of cases per 100000 person-years of follow-up and 95% CI. Bivariate associations between independent variables and survival were studied using Kaplan–Meier curves and compared with log-rank tests. The date of admission to the hospital and the date of death were used for analysis. The time interval is presented by days. There were no censored observations. The survival assessment and determining outcome were the same for all objects included in the study at earlier or later dates. Comparison between men and women, age group, nationalty was made. The study was approved by the ethical committee of the Semey Medical University, Kazakhstan (protocol 2 from 22 Oktober 2021)

Results

In total, 558 patients were observed in the Semey Infectious Hospital from July 1 to September 30 of 2021. Of these 220 (39,4%) were male, 338 (60,6%) were female. Kazakhs were 352 (63,1%), Russians were 158 (28,3%), Other nationality were 48 (8,6%). Mean age of all patients was 60,3 (±15,5) years. At the same time, the age group of up to 30 years was 28 (5,0%), the age group of 31-49 years was 88 (15,8%), the age group of 50-69 years was 277(49,6%), over 70 years was 165 (29,6%). The mean time inhospital period was 9,97 (±5,14) days. The main in-

hospital outcome at patients was improvement 505 (90,5%), pathients without changes were 2 (0,4%), death was registered in 51 (9,1%) cases.

A total 51 (9,1%) patients died during in-hospital period. Patients who died in-hospital period were predominantly female (58,8%), mean age 66,4 (±13,6) years. Mortality rate was higher in men, in other nationalty and age group patients older 70 years. The baseline patients' characteristics are presented in Table 1 and 2.

Table 1.

Patients' characteristics.

Characteristics	**N=558**
Male, n (%)	220 (39,4%)
Female, n (%)	338 (60,6%)
Age (yr), mean (SD)	60,3 (±15,5)
Male (yr), mean (SD)	59,0 (±16,4)
Female (yr), mean (SD)	61,1 (±14,9)
Nationality	
Kazakhs	352 (63,1%)
Russians	158 (28,3%)
Other	48 (8,6%)
Age group n (%)	
up to 30 years	28 (5,0%)
31-49	88 (15,8%)
50-69	277 (49,6%)
70+	165 (29,6%)
Length of stay (n) mean (SD)	9,97 (±5,12)
Men	9,96 (±4,77)
Women	9,97 (±5,37)
Outcome n (%)	
Improvement	505 (90,5%)
No changes	2 (0,4%)
Death	51 (9,1%)

Table 2.

Patients' characteristics who died in-hospital period.

Characteristics	**N=51**
Male, n (%)	21 (41,2%)
Female, n (%)	30 (58,8%)
Age (yr), mean (SD)	66,4 (±13,6)
Male (yr), mean (SD)	62,9 (±16,2)
Female (yr), mean (SD)	68,9 (±11,2)
Mortality rate per 100 000 population	
Male (yr), mean (95% CI)	9545,5 (5908,8-14591,2)
Female (yr), mean (95% CI)	8875,7 (5999,4-12670,1)
Nationality	
Kazakhs	32 (62,7%)
Russians	13 (25,5%)
Other	6 (11,8%)
Mortality rate per 100 000 population	
Kazakhs	9090,9 (6218,2-12833,7)
Russians	8227,8 (4381,0-14069,8)
Other	12500,0 (4587,4-27207,0)
Age group	
up to 30 years	2 (3,9%)
31-49	3 (5,9%)
50-69	21 (41,2%)
70+	25 (49,0%)
Mortality rate per 100 000 population	
up to 30 years	7142,8 (865,2-25802,5)
31-49	3409,1 (703,0-9962,9)
50-69	7581,2 (4692,9-11588,7)
70+	15151,5 (9805,2-22366,7)
Length of stay mean (SD)	
Men	12,5 (±6,89)
Women	18,0 (±11,6)
up to 30 years	5,50 (±4,95)
31-49	14,7 (±8,74)
50-69	19,6 (±12,1)
70+	13,4 (±7,84)

On the table 3 represents the number of men and women by age group.

As can be seen from the table 3, male patients predominated in the age group up to 30 years, female patients predominated in the older age groups, so in the age group of 31-49 years, women were 58,%, in the age group of 50-69 years, women were 64,6%, in the age group over 70 years, women were 58,8%.

It does not mean that women get sick more often by COVID-19, these indicators corresponded to demographic indicators in the Republic of Kazakhstan, where women predominate in the older age group.

The relative mortality rate was higher at women but incidence rate was higher at men and was 9545,5 per 100,000 population. Although the relative mortality rates were higher in Kazakh population, but the mortality rate was higher in other nationalities and was 12500,0 per 100,000 population. (Table 2)

Table 3.

Age group by sex.

Age group	Total number	Men	Women
up to 30 years	28 (100%)	17 (60,7%)	11 (39,3%)
31-49	88 (100%)	37 (42,0%)	51 (58,0%)
50-69	277 (100%)	98 (35,4%)	179 (64,6%)
70+	165 (100%)	68 (41,2%)	97 (58,8%)

The average age of patients with an unfavorable outcome was 66,4 (95%CI:62,6-70,3) years, SD=13,6, the youngest patient was 26 years old, the oldest was 88 years old. At the same time, the mortality rate was also high in the age group of 70 and older, 15151,5 per 100,000 population, followed by the age group of 50-69 years, where the mortality rate was 7581,2 per 100,000 population (Table 2).

On the table 4 represents outcomes of patients admitted to the infectious hospital of Semey by age group

Table 4. **Outcomes of patients by age group.**

	Improvement	No changes	Death
Age group			
up to 30 years	25 (89,3%)	1 (3,6%)	2 (7,1%)
31-49	85 (96,6%)	0 (0,0%)	3 (3,4%)
50-69	256 (92,4%)	0 (0,0%)	21 (7,6%)
70+	139 (84,2%)	1 (0,6%)	25 (15,2%)
Sex			
Men	197 (89,5%)	2 (0,9%)	21 (9,5%)
Women	308 (91,1%)	0 (0,0%)	30 (8,9%)
Nationality			
Kazakh	318 (90,3%)	2 (0,6%)	32 (9,1%)
Russian	145 (91,8%)	0 (0,0%)	13 (8,2%)
Other nationality	42 (87,5%)	0 (0,0%)	6 (12,5%)

As can be seen from the table 4, the largest percentage of deaths from COVID-19 inhospital period was in the age group of 70 and older (15,2%), followed by the age group of 50-69 (7,6%), in the age group up to 30 years, the number of deaths was 7,1%.

Figure 1, Figure 2, and Figure 3 shows Kaplan-Meier curves for the cumulative incidence of the clinical outcomes.

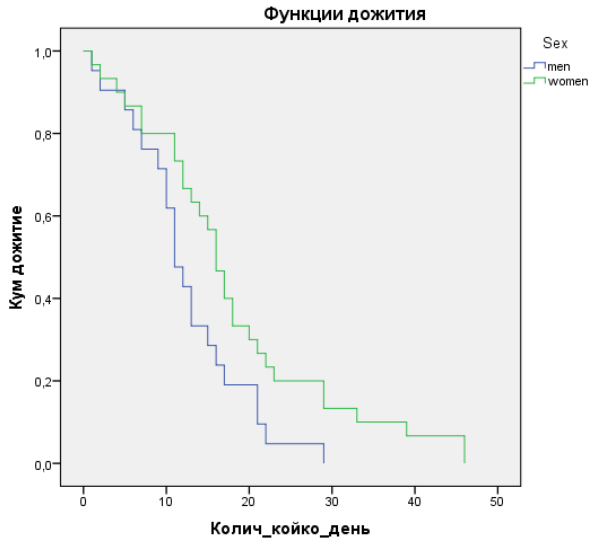

Figure 1. Kaplan–Meier survival curves for follow-up time based on sex

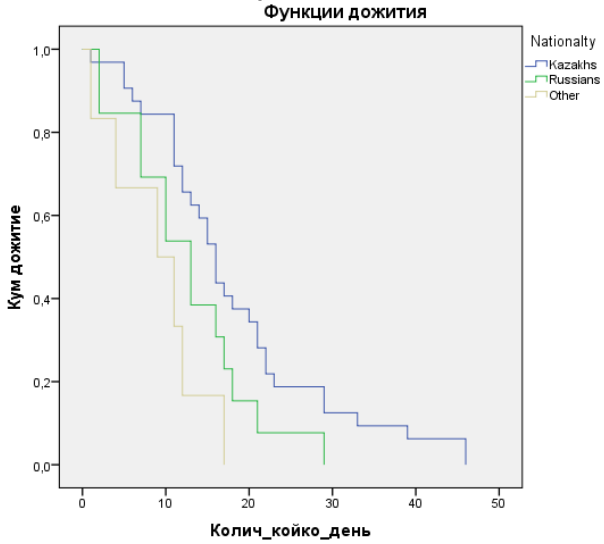

Figure 3. Kaplan–Meier survival curves for follow-up time based on nationalty

There are significant difference the mean follow-up time between men and women (12,5 and 18,0 days, log rank p=0,032) (Figure 1), significant difference the mean follow-up time between age group (5,5, 14,7, 19,6 and 13,4 days, log rank p=0,009) (Figure 2), and significant difference the mean follow-up time between nationalty (18,2, 13,0 and 9,0 days, log rank p=0,015) (Figure 3).

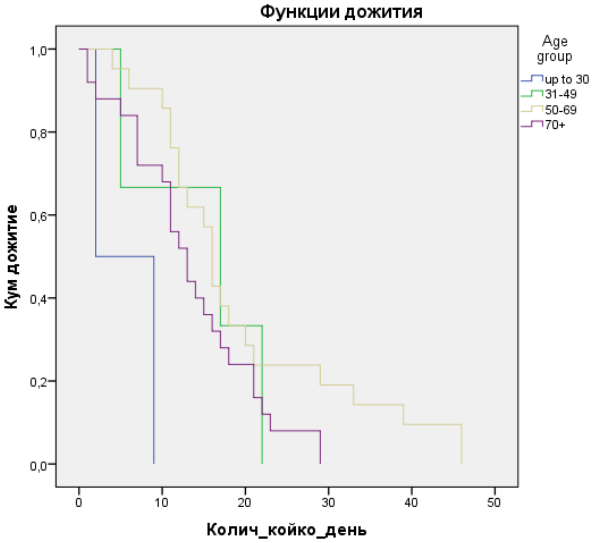

Figure 2. Kaplan–Meier survival curves based by age group

Discussion. In this study, we compared patients' characteristics and adverse outcomes of patients with COVID-19 in the Semey Infectious Hospital from July 1 to September 30 of 2021. The main finding of our study is the same as in the world. According to many international investigations the average age in patient who died from COVID-19 is approximately 61 years [5]. The average age of our patients was 60,3 (±15,5) years, while the average age of men was 59,0 (±16,4) years, and of women was 61,1 (±14,9) years. The average age of patients who died inhospital period was 66,4 (±13,6) years, while the average age of men was 62,9 (±16,2) years, and of women was 68,9 (±11,2) years.

The Global Health 50/50 research initiative presented an impressive overview of sex-disaggregated data from countries worldwide clearly demonstrating similar numbers of cases in women and men, but an increased case fatality in men [6].

According to our investigation the quantity of death was higher in women (58,8%), but the mortality rate was

higher in men (9545,5 per 100,000 population). The mean follow-up time for patients who died during in-hospital period from COVID-19 was 15,7 (95%CI:12,9-18,5) days. The mean follow-up time for men was 12,5 (95%CI:9,5-15,4) days. For women it was 18,0 (95%CI:13,8-22,2) days. Kaplan-Meier analysis of freedom from mortality revealed significant difference between sex ($\chi2$=4,577, df=1, p=0,032) (Figure 1).

Unfortunately, according to our study, two cases of death were registered among the age group up to 30 years and three cases of death in age group of 31-49 years. The mean follow-up time for age group up to 30 years who died during in-hospital period from COVID-19 was 5,5 (95%CI:-0,0-12,4) days, in age group of 31-49 was 14,7 (95%CI:-4,8-24,5) days, in the age group of 50-69 was 19,6 (95%CI:14,4-24,7) days, in the age group of 70+ was 13,4 (95%CI:10,4-16,5) days. Kaplan-Meier analysis of freedom from mortality revealed significant difference between age group ($\chi2$=11,557, df=3, p=0,009) (Figure 2).

The quantity of death between nationalty was higher in Kazakhs (62,7%), but the mortality rate was higher in other nationalty (12500,0 per 100,000 population).The mean follow-up time for Kazakhs nationalty who died during in-hospital period from COVID-19 was 18,2 (95%CI:14,4-22,0) days, for Russians was 12,7 (95%CI:8,5-16,8) days, for other nationalty 9,0 (95%CI:4,4-13,6) days. Kaplan-Meier analysis of freedom from mortality revealed significant difference between nationalty ($\chi2$=8,373, df=2, p=0,015) (Figure 3).

Conclusion. The main in-hospital outcome in patients was improvement. Patients who died in-hospital period were predominantly female, mean age 66,4 (±13,6) years. Mortality rate was higher in men, in other nationalty and age group patients older 70 years. The relative mortality rate was high in Kazakh population, but the mortality rate was higher in other nationalities. The mortality rate was high in the age group of 70 and older, followed by the age group of 50-69 years. There was significant difference the mean follow-up time between men and women, between age group, and nationalty.

Conflict of interest *- The authors declare that they do not have any competing interests.*

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References:

1. *Bai Y., Yao L., Wei T., Tian F.et al.* Presumed Asymptomatic Carrier Transmission of COVID-19. // JAMA. 2020; 323 (14):1406-1407 [CrossRef] [PubMed]]

2. BNO Tracking Coronavirus: Map, Data and Timeline. https://bnonews.com/index.php/2020/02/the-latest-coronavirus-cases/ (accessed on 18 March 2020)

3. *Chen N., Zhou M., Dong X., Qu J., Gong F., Han Y., Qiu Y., Wang J., Liu Y., Wei Y. et al.* Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study // Lancet. 2020;395:507–513

4. Coronarvirus Resource Center, Johns Hopkins University Medicine. 2020. Johns Hopkins University Medicine. Medicine JHU. https://coronavirus.jhu.edu/map.html https://coronavirus.jhu.edu/map.html (accessed: 22.03.2020).

5. *European Society of Cardiology. COVID-19 experience in Bergamo, Italy* // European Heart Journal. 2020;41:1783–1797 doi:10.1093/eurheartj/ehaa279

6. *Gebhard et al. Impact of sex and gender on COVID-19 outcomes in Europe* // Biology of Sex Differences. 2020;11:29 https://doi.org/10.1186/s13293-020-00304-9 (accessed: 22.03.2020).

7. *Grasselli G., Pesenti A., Cecconi M.* Critical Care Utilization for the COVID-19 Outbreak in Lombardy, Italy: Early Experience and Forecast During an Emergency Response // Jama. 2020; 323 (16):1545-1546 https://doi.org/10.1001/jama.2020.4031 (accessed: 22.03.2020).

8. *Guan W.J., Ni Z.Y., Hu Y., Liang W.H. et al.* Clinical Characteristics of Coronavirus Disease 2019 in China // N. Engl. J. Med. 2020; 382: 1708-20. [CrossRef] [PubMed]

9. *Liang Su, Xiang Ma, Huafeng Yu, Zhaohua Zhang et al.,* The different clinical characteristics of corona virus disease cases between children and their families in China–the character of children with COVID19 // Emerging Microbes & Infections 9. 2020;1:707–713, https://doi.org/10.1080/22221751.2020.1744483.

10. *Onder G., Rezza G., Brusaferro S.* Case-fatality rate and characteristics of patients dying in relation to Covid-19 in Italy. JAMA. 2020; 323 (18):1775-1776 https://doi.org/10.1001/jama.2020.4683

11. *Wang D., Hu B., Hu C. et al.* Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China // Jama. 2020; 323 (11):1061-1069 https://doi.org/10.1001/jama.2020.1585. (accessed: 22.03.2020).

12. Who director-general's opening remarks at the media briefing on Covid-19 - 11 March 2020. 2020. World Health Organisation. https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-mediabriefing-on-covid-19%2D%2D-11-march-2020 (accessed: 22.03.2020)

13. *Wu C., Chen X., Cai Y., Xia J., et al.* Risk factors associated with acute respiratory distress syndrome and death in patients with coronavirus disease 2019 pneumonia in Wuhan, China // JAMA Intern Med. 2020 Jul 1;180 (7):1031 https://doi.org/10.1001/jamainternmed.2020.0994 (accessed: 22.03.2020).

14. *Zhalmagambetov B., Madikenova M., Paizullayeva S., Abbay A., Gaipov A.* COVID-19 Outbreak in Kazakhstan: Current Status and Challenges // J Clin Med Kaz. 2020;1(55):6-8

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