

# MANIFESTATIONS DYNAMICS OF THE EPIDEMIC PROCESS IN CORONAVIRUS INFECTION (COVID-19) AND PNEUMONIA IN THE JALAL-ABAD REGION KYRGYZ REPUBLIC FROM MARCH TO DECEMBER 2020

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## Abstract

The article reflects assessment of the COVID-19 incidence and community-acquired pneumonia in the Jalal-Abad region of the Kyrgyz Republic. Cases of coronavirus infection were analyzed by months in cities and districts, by gender, age, contingents, asymptomatic forms, severity, course, mortality among patients during the 2020 pandemic. In the course of analysis, it was found that the largest proportion among patients with non-hospital pneumonia in the Jalal-Abad region was at the age from 30 to 64 years old 71%, then 65 and older 25%, and 18 to 29 years old 3,4% of patients. In other ages, their value was from 0.07% to 0.3%. The coronavirus infection assessment results by city and district indicate that the highest proportion of coronavirus infection among the unemployed 34.1% of population, then civil servants were 13.6% and medical workers were 12.5%. If we are talking about adolescents and school children, incidence was about 3.5%, private entrepreneurs were 1.8% and sellers were 0.7%. Mortality from out-of-hospital pneumonia in the region was higher to 3.2% than COVID-19 which was 1.19%. The number of ill women was more than men, from 3.4% to 6.4%. According to severity of patients with COVID-19 and community-acquired pneumonia disease with the first place is moderate (47.2% to 53.8%), the second is mild (22.7% to 24.6%), then comes the severe course (12.2% to 17.5%) and extremely severe course (2.7% to 4%). Among the diseased patients with COVID-19, asymptomatic forms of disease were registered 14.9% and community-acquired pneumonia 0.1%.

**Keywords:** COVID-19, out-of-hospital pneumonia, periods, foci, severity, profession, mortality, asymptomatic forms, day hospitals, mobile team

**Relevance.** From 2020 to 2021 years, the global community is facing an unprecedented biological threat due to the emergence of a respiratory infection caused by the new SARS-CoV-2 coronavirus [1-4]. In the context of the COVID-19 pandemic, focal morbidity in organized, unorganized, family groups with many children posed a great danger. Studying the impact of restrictive and anti-epidemic measures on the epidemic process of COVID-19 will solve the issue of preventing focal morbidity.

Staying in hospitals, especially during the COVID-19 pandemic, when patients with a severe form of infection receive long-term oxygen support, contributes to the addition of multi-resistant flora and an unfavorable outcome of the disease. Of great relevance against the background of the pandemic of a new coronavirus infection COVID-19, which is associated with high mortality, its main causes may be respiratory failure (RF), acute respiratory distress syndrome (ARDS), thrombotic complications, etc.

During the COVID-19 pandemic, medical workers became one of the most vulnerable and actively involved in the epidemic process [5-7]. Registering patients, providing first aid, drawing up a treatment plan and developing preventive measures using an analysis of epidemiological situation is also the role of medical workers.

Coronavirus infection cases were registered in all regions worldwide; the number of registered patients significantly exceeds more than 100 million. Viral diseases are the cause of large-scale epidemics in human history in recent years. Coronavirus infection COVID-19, caused by the SARS-CoV-2 virus, marked the beginning of a new epidemic. An important aspect of the successful control in the spread of SARS-CoV-2 has been the development and implementation of vaccination among population. During pandemic, the genome of SARS-CoV-2 virus underwent mutational changes, as a result of which the pathogen acquired the ability to reproduce more efficiently and, accordingly, spread rapidly.

The purpose of this work is to analyze the incidence of COVID-19 and community-acquired pneumonia in population of Jalal-Abad region and organized, non-organized, large families, teams during the pandemic from March to June 2020, taking into account the lifting restrictions stages to assess the prevalence of COVID-19 among medical workers and factors of occupational risk of infection for the development of corrective measures.

## RESEARCH MATERIALS AND METHODS

Materials for study were the registered COVID-19 incidence cases and non-hospital pneumonia in the Jalal-Abad region for 2020 year. An analytical study is more promising, in the period from March 11, 2020 to December 30, 2020, in 397 COVID-19 foci formed in large families in Jalal-Abad region, with a total number of cases 4598 and 5145 patients outside hospital-acquired pneumonia. Epidemiological and statistical methods were used.

Processing of study materials carried out based on results of operational epidemiological analysis of morbidity, with 4598 observations. Pathogen isolation was carried out by PCR study, statistical processing by "Microsoft Excel" program.

## RESULTS AND DISCUSSION

Monthly study of the COVID-19 incidence cases and non-hospital pneumonia in Jalal-Abad region for 2020 year registered 4598 (368.9 per 100 thousand) cases of COVID-19 and 5145 (412.8 per 100 thousand) cases of non-hospital pneumonia. In the region, the onset of the COVID-19 incidence in March, and cases of non-hospital pneumonia were observed in June as shown in the Table 1.

For the first time in the region, COVID-19 and out-of-hospital infection was registered in the Suzak district: in March, COVID-19 patients were 46 (15.2 per 100 thousand population) cases, in June, community-acquired pneumonia patients were 15.2 per 100 thousand people among population (8 cases). In the reporting year, 4598 patients were treated in infectious diseases and repurposed hospitals of region, 5145 of them with community-acquired viral pneumonia. In Jalal-Abad region, the highest incidence of COVID-19 was registered in Mailuu-Suu city 1663.2 people per 100 thousand people.

Among all those infected with SARS-CoV-2, regardless of the condition severity, they were hospitalized. Then in the Chatkal region 907.3 and the cities of Jalal-Abad 698.9, Kara-Kol 530.6 people per 100 thousand population. According to non-hospital pneumonia in the Kara-Kul city were 845.1 per 100 thousand population, then in the Chatkal region were 715.1 and in the Mailuu-Suu were 624.2 and in the Nooken region were 550.6 people per 100 thousand population.

During the pandemic, a high incidence rate of the population of COVID-19 was also registered outside of hospital-acquired pneumonia, in the city of Mailuu-Suu and the Chatkal region. Disease cases were registered in all 4 cities and 8 districts in region. By months in the Jalal-Abad region, an increase in the incidence of COVID-19 was registered in the summer period for July 69.2, in the autumn period in October 114.4 people per 100 thousand population.

For community-acquired pneumonia in the summer period July were 149.9 and in the autumn period November were 98.9 people per 100 thousand population followed by its maximum. The peak incidence was due to COVID-19 and outside hospital-acquired pneumonia in the summer period in July, in the autumn period, COVID-19 in October and outside hospital-acquired pneumonia in November. The high incidence of COVID-19 among population occurred in summer July and in the Mailuu-Suu city were 290.7, in Jalal-Abad were 192.2 and in Chatkal region were 213.4 per 100 thousand population.

For community-acquired pneumonia in the summer period July were 149.9 and in the autumn period in November were 98.9 people per 100 thousand population and reached its maximum. The peak incidence was due to COVID-19 and outside hospital-acquired pneumonia in the summer period July, in the autumn period, COVID-19 in October and

outside hospital-acquired pneumonia in November. The high incidence of COVID-19 among population occurred in the summer July.

In the autumn period, the peak incidence of non-hospital pneumonia was in November, in the Kara-Kul city were 272.8 and Tash-Komur were 262.1 people per 100000 population. There were no cases outside of hospital-acquired pneumonia in certain areas of the region in the autumn period: - Toguz-Torun region (September, October and November), Nooken region and the city of Kara-Kol (September). In the summer in Toktogul district in August, in the city of Tash-Komur in August and December.

There were no cases of COVID-19 in the Tash-Komur city from March to June, in Bazar-Korgon district from March to May, and Nooken and Toktogul districts from March to April. In the autumn period from September to October, there were no cases of COVID-19 only in the Toguz-Torun region. The data we obtained on the monthly distribution of COVID-19 diseases and outside of hospital-acquired pneumonia in Jalal-Abad, there is a longer seasonal increase in the incidence.

**Table 1: Morbidity rates of COVID-19 and non-hospital pneumonia, in the Jalal-Abad region (per 100 thousand population)**

| Diseases  | Population 1246206                 |     |     |      |       |      |      |       |      |      | Total |
|---|------------------------------------|-----|-----|------|-------|------|------|-------|------|------|-------|
|   | Children up to 14 years old 406972 |     |     |      |       |      |      |       |      |      |       |
|   | Months                             |     |     |      |       |      |      |       |      |      |       |
|   | III                                | IV  | V   | VI   | VII   | VII  | IX   | X     | XI   | XII  |       |
| COVID-19<br>n=4598                                    | 54                                 | 67  | 41  | 248  | 863   | 469  | 168  | 1426  | 1039 | 223  | 4598  |
| Values intensity<br>per 100<br>thousand<br>population | 4.3                                | 3.3 | 3.2 | 19.9 | 69.2  | 37.6 | 13.4 | 114.4 | 83.3 | 17.8 | 368.9 |
| Acute<br>pneumonia<br>n=5145                          | 0                                  | 0   | 0   | 16   | 1869  | 471  | 167  | 1089  | 1233 | 309  | 5145  |
| Values intensity<br>per 100<br>thousand<br>population | 0                                  | 0   | 0   | 1.2  | 149.9 | 37.7 | 13.4 | 87.3  | 98.9 | 24.7 | 412.8 |

The largest proportion of patients with COVID-19 (64%) and outside hospital-acquired pneumonia were 71% in region, in the first place, age: 30 to 64 years, in second place 65 and above COVID-19, 15.6% and outside hospital-acquired pneumonia were 25% , then from 18 to 29 years old with COVID were 13.7%, and outside hospital-acquired pneumonia were 3.4%. The rest of the ages with COVID-19, the proportion of cases is from 0.3% to 2.7%. According to out-of-hospital pneumonia aged from 0 to 6 years old were 2 cases as shown in the Table 2. The largest proportion of patients with COVID-19 aged 30 to 64 years old was noted in Toktogul 74.8%, and in Chatkal region was 69.8%.

According to non-hospital pneumonia in the Tash-Kumur city were 80.3%, in the Kara-Kul were 78.4%, in Mailuu-Suu were 75.2% and in Jalal-Abad were 72.6% cases, in Bazar-Korgon, and Nooken districts were 1.3 % of cases. Over 65 years of age, COVID-19 was registered in the Kara-Kol city 25%, outside hospital-acquired pneumonia in Aksy 28.6% and in Toktogul district 28.1%. At age from 18 to 29 years, more COVID-19 patients were in the Nooken 22.1%, in Bazar-Korgon were 17.2% districts and community-acquired pneumonia in Toguz-Torundistrictwere 10.4%.

**Table 2: Distribution of patients with COVID-19, and community-acquired pneumonia by age**

| Nosology                       | Age / years old |     |     |      |       |       |       |              | Died | Total |
|--------------------------------|-----------------|-----|-----|------|-------|-------|-------|--------------|------|-------|
|                                | 0-1             | 2-4 | 5-6 | 7-14 | 15-17 | 18-29 | 30-64 | 65 and older |      |       |
| <b>COVID-19</b><br>Abs. number | 50              | 37  | 20  | 127  | 71    | 631   | 2945  | 717          | 55   | 4598  |
| <b>COVID-19 %</b>              | 0.9             | 0.8 | 0.4 | 2.7  | 1.5   | 13.7  | 64    | 15.6         | 1.2  | 100   |
| Pneumonia<br>Abs. number       | 1               | 0   | 1   | 1    | 11    | 176   | 3651  | 1289         | 168  | 5145  |
| Pneumonia %                    | 0.3             | 0   | 0.3 | 0.3  | 0.2   | 3.4   | 71    | 25           | 3.3  | 100   |

Analyzing the incidence of occupational disease structure in people among cities and districts in the region, it is noted that highest registration 34.1% of all coronavirus infection diseases was registered among unemployed, and civil servants 13.6% and medical workers 12.5%. Schoolchildren3.5%, unorganized children 2.1%, private entrepreneurs1.8% and sellers is 0.7%. The proportion of sick students were 1.6% (Table 3).

Among sick medical workers, 59.1% of the diagnosis is laboratory-confirmed cases. 214 health workers worked in the red zone, received compensation 27.4%. 2 doctors and 1 nurse fell ill and died. A high incidence among medical workers was registered in the Toguz-Toron 35.6%, in Toktogul 19.4% and in Ala-Buka districts 18.1%, in Tash-Komur city 18.9%. The smallest proportion of health workers with COVID-19 were registered in Nooken 7.4% and in the Jalal-Abad city 8.6%.

**Table 3: Occupational composition of patients with COVID-19 and acute pneumonia**

| Indicators | Occupational disorders structure |                |             |         |            |                    |             |          |            |         |                            |                               | Total |      |
|------------|----------------------------------|----------------|-------------|---------|------------|--------------------|-------------|----------|------------|---------|----------------------------|-------------------------------|-------|------|
|            | Medical workers                  | Schoolchildren | Unorganized | Sellers | Unemployed | Government workers | Businessmen | Students | Pensioners | Workers | Temporary detention center | Police and military employees |       | Rest |
| Abs. No.   | 576                              | 161            | 100         | 35      | 1570       | 628                | 83          | 23       | 1065       | 256     | 10                         | 91                            | 1445  | 4598 |
| %          | 12.5                             | 3.5            | 2.1         | 0.7     | 34.1       | 13.6               | 1.8         | 1.6      | 73.7       | 17.7    | 0.7                        | 6.2                           | 31.4  | 100  |

In the region, more women fell ill by gender with COVID-19 and community-acquired pneumonia (53% and 52.2%), among men less (46.8 to 48.8%) as shown in the Table 4. But in some districts and cities of the region, among men, COVID-19 was more with non-hospital pneumonia. So, in the Bazar-Korgon district, the proportion of cases of COVID-19 among men is 51.2% and outside hospital-acquired pneumonia among men in Ala-Buka 54.8%, in Nooken 56.3%.

Among the diseased patients with COVID-19, asymptomatic forms of the disease were registered in the region 14.9% and outside hospital-acquired pneumonia 0.1%. The largest share of asymptomatic COVID-19 patients was registered in Nooken (65.2%), Ala-Bukinsk (41.4%).

Asymptomatic forms outside hospital-acquired pneumonia were registered only in Toktogul (0.8%) and Ala-Buka (0.4%) districts, in other districts and region there were no cases of asymptomatic forms (Table 3). There were no asymptomatic forms of COVID-19 in the region only in the city of Kara-Kul. In other cities and districts of the region, the number of cases of asymptomatic form ranged from 1.25% to 21%.

In terms of severity, the course of the disease in patients with COVID-19 and outside hospital-acquired pneumonia, in the region more was moderate (47.2% to 53.8%), the second place was mild (22.7% to 24.6%), then severe (12.2% to 17.5%) and extremely severe course (2.7% -4%). Above the regional specific gravity, moderate severity was registered outside hospital-acquired pneumonia in Toktogul (79.5%), Aksy (79.2%), Chatkal (73.1%) district and the city of Mailuu-Suu (74.5%).

Average severe patients with COVID-19, in the region, more were registered in the Kara-Kol city (72%) and Suzak district (62.3%). Above the regional indicator is 24.6% of the specific incidence gravity of non-hospital pneumonia with mild course, it was noted in districts of Bazar-Korgon 74%, Ala-Buka 65% and the cities of Jalal-Abad 85.2%, Kara-Kol 46, 6%. The share of mild COVID-19, more cases in the Jalal-Abad city (44.3%) and the Toguz-Toro region (32.8%).

A mild course of community-acquired pneumonia in the region was not registered in Aksy, Suzak, Toguz-Torun and Mailuu-Suu city. In these areas, cities were mostly infected with moderate, severe and extremely severe forms of disease. The highest proportion of severe form of non-hospital pneumonia in the region was registered in Toguz-Torun district 73.3%, a larger proportion of severe COVID-19, disease in Bazar-Korgon district 49% and in Tash-Kumur city 27.2%, in Mailuu -Suu 19.3%. In Jalal-Abad region, a high proportion of extremely severe forms of community-acquired pneumonia was noted in Ala-Buka district, which amounted to 9.7% and in the Jalal-Abad 7.6%.

A large proportion of extremely seriously ill patients were recorded with COVID-19 in Bazar-Korgon district (11.7%) and Toktogul district (5.9%). In the region, there were no patients with extremely severe community-acquired pneumonia and COVID-19 in Toguz-Torun district. Despite the large proportion of registration in the region of severe (49%)

and extremely severe (11.7%) forms of the disease in the Bazar-Korgon district, the mortality rate is lower (1.5%) than in other districts and cities.

In some districts, proportion of patients with severe and extremely severe forms of the disease is lower than in other districts and cities of the region, but mortality from COVID-19 is higher than the regional one: Toguz-Torun 4.1% and Aksy 3% districts. Despite the large share of registration of moderate severity in Chatkal 57.6% and the city of Mailuu-Suu 72% and extremely severe 19.3% in these areas there was no mortality from the number of cases of COVID-19.

**Table 4: General characteristics of patients with COVID-19 and community-acquired pneumonia by gender and severity**

| Disease name | n    | Gender |        | Severity level |         |       |                 | Without symptoms |
|--------------|------|--------|--------|----------------|---------|-------|-----------------|------------------|
|              |      | male   | female | light          | average | heavy | Extremely heavy |                  |
| COVID-19     | 4598 | 2156   | 2442   | 1047           | 2174    | 564   | 127             | 686              |
|              |      | 46.8   | 53.2   | 22.7           | 47.2    | 12.2  | 2.7             | 14.9             |
| pneumonia    | 5145 | 2512   | 2633   | 1267           | 2766    | 903   | 206             | 3                |
|              |      | 48.8   | 52.2   | 24.6           | 53.8    | 17.5  | 4               | 0.1              |

To organize medical care for patients with a corona virus infection during pandemic in districts and cities of the region, mobile teams were created in the organization of primary health care to prevent further spread of infection in the family medicine center, from March 28 to August 1, 2020, 35 mobile team brigades were organized during first wave of the coronavirus pandemic.

They carried out medical examinations, identification of outbreak contacts, collection of PCR tests, prevention conversations on corona virus infection and carried out medical observation in the outbreak for 14 days, provided medical assistance on house call for coronavirus infection, etc. They also carried out medical observations discharged patients with coronavirus infection from the hospital. They visited 20922 houses and carried out medical observations on 34331 people, of which 31927 people were removed from medical observation.

On the second wave of the corona virus pandemic, 18 mobile teams were organized in the region, they visited and provided medical assistance to 7849 people and carried out PCR tests. Of the medical care provided, 878 patients were referred for inpatient treatment. Outpatient treatment was organized for 367 patients. To organize medical care for patients with mild corona virus infection on an outpatient basis, during the pandemic, together with local administrations, a total of 47 day hospitals with 1957 beds were organized and opened.

43435 patients applied for medical assistance to the day hospital, 10 of them were children. Of those who applied, 7231 patients were sent for hospitalization Day hospitals were organized in Ala-Buka district 13, in the Nooken and Chakal districts 6 for each, in

Bazar-Korgon and Suzak districts 5 for each, in the Jalal-Abad city 3 and other districts and cities by 1-2. Runtime bunk days were 227420. Provision of beds for 10 thousand people, population in the region was 212.4.

Provision of beds per 10 thousand people in Toktogul districts was 27.0, in Chatkal was 26.5, in Aksy was 22.5, and the Kara-Kul city was 20.7. In other districts and cities, provision of beds ranged from 9.3 to 19 per 10 thousand population.

The average stay of patients in bed days in the region was 65.2. In day hospitals, the average stay on a bed in Suzak district is 8.6, in the Tash-Kumurcity 7.6, in Bazar-Korgon district 7.4, in Nooken district was 7.0. In the rest of the district and city day hospitals, the average stay ranges from 3.2 to 5.4 days. The work of a bed in day hospitals in the region amounted to 1358.0. High rates of bed work were in Aksy (301.2), Toktogul (231) districts and the Jalal-Abad cities (183.5) and in Kara-Kul (157.8).

Low rates of bed work were in Bazar-Korgon 34.3, Nooken 65.6 and the Mailuu-Suu city 57.9. The implementation percentage of bed plan in day hospitals in the region amounted to 39.9%. The high percentage of beds in the day hospital of the region was in the Tash-Komur city 88.6%, in Toktogul 67.9%, in the Jalal-Abad district and city 54.0%, in Kara-Kul (46.4%) cities, the percentage of completion is low (from 10.1% to 40%). Day hospitals were equipped with 102 ventilators, 89 oxygen concentrators and medicines for emergency medical care.

During the first wave of pandemics in the region from May 15 to August 31, 2020, hotline-118 worked to provide high-quality and timely medical care to population with corona virus infection. During this period, 7812 calls were received and answered, of which 667 calls were transferred to mobile teams, they provided medical assistance and collected laboratory tests. 2877 cases of calls were answered on the issue of corona virus infection. And also, 1067 cases of calls were on various issues.

## CONCLUSION

1. In the region, the onset of COVID-19 incidence started in March, outside of hospital-acquired pneumonia started in June.
2. By months in the region, a high COVID-19 incidence was registered in the summer period for July 69.2, in the autumn period in October 114.4 per 100 thousand population. For community-acquired pneumonia in the summer period for July 149.9 and in the autumn period for November 98.9 per 100 thousand population.
3. The peak incidence was due to COVID-19 and outside hospital pneumonia in the summer period in July, in the autumn period, COVID-19 in October and outside hospital pneumonia in November.
4. During the pandemic, the largest number of people infected with COVID-19 and community-acquired pneumonia were recorded in the Mailuu-Suu and the Chatkal region.



5. The largest proportion of patients with COVID-19 and community-acquired pneumonia in the region was, in the first place, age: from 30 to 64 years, in second place 65 and above, then 18 to 29 years.
6. The epidemiological situation of COVID-19 in the Jalal-Abad region of the Kyrgyz Republic is characterized as tense, especially in those areas where the bulk of industrial enterprises and large transport links are concentrated.

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