

Dynamics of Flu-Like Diseases During the Coronavirus Pandemic

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Abstract Goal. To study the epidemiological indicators of flu-like diseases during the coronavirus pandemic. Methods. Descriptive-evaluative and analytical techniques were used as part of epidemiological surveillance. For a comparative assessment of the main epidemiological characteristics of seasonal and pandemic influenza in a pandemic, a retrospective epidemiological analysis of the incidence of this infection was carried out. The long-term dynamics of the incidence of influenza and ARVI were studied, the long-term epidemic trend was determined. Results. The dynamics of morbidity rates in the seasons 2019/20, 2020/21, 2021/22 and the initial period of the season 2022/23 are analyzed. It has been established that since the beginning of the coronavirus pandemic in the Republic of Uzbekistan, there has been a significant decrease in the incidence of SARS. At the same time, the analyzed data cannot be considered absolutely reliable, due to the fact that in the conditions of the pandemic it was not possible to perform appropriate serological detection of ARVI pathogens on a sufficient scale. Nevertheless, the results obtained are consistent with the results of foreign studies [14,15,16] and allow us to state that the circulation of a new highly contagious strain of the respiratory virus in the form of SARS-CoV-2 in a certain way suppresses other seasonal varieties of ARVI, which the population encounters on an ongoing basis annually. Conclusion. Significant changes in the epidemiological indicators of influenza-like diseases during the coronavirus pandemic in the Republic of Uzbekistan have been established, which were mainly manifested by a decrease in morbidity against the background of an increase in the incidence of COVID-19. The data obtained indicate the probable presence of interference between the pathogens of COVID-19 and other acute respiratory infections.

Keywords Coronavirus infection, Pandemic, COVID-19, Flu-like diseases, ARVI, Interference

1. Introduction

At the end of January 2020, the World Health Organization (WHO) declared an outbreak of a new coronavirus infection caused by the SARS-CoV-2 virus a public health emergency and in March the scale of its spread was regarded as a pandemic [1,2,3,4]. In the conditions of a pandemic, epidemiological studies are of great importance for assessing the severity and predicting its course.

One of the directions of these studies should be the study of the relationship between the prevailing pandemic pathogen and other pathogens of infectious diseases that play a role in the development of seasonal epidemics. In particular, the work on the study of the relationship between the causative agent COVID-19 and the causative agents of other common acute respiratory viral infections (ARVI), which annually cause outbreaks of epidemics, is of interest [5,6].

According to various sources [7,8,9,10,11], the development of the coronavirus pandemic led to a significant decrease in

the degree of circulation of influenza viruses, which was most pronounced in the period 2020-2021, especially in the countries of the Northern hemisphere. In this regard, there is an assumption of interference between the coronavirus and other pathogens of ARVI. The concept of "interference" implies a significant decrease in the intensity of circulation of certain viruses under the influence of other viruses that are in a state of active spread in the population.

In the conditions of the coronavirus pandemic, an excessively limited number of suitable influenza virus strains have been isolated that meet the requirements for influenza vaccines for the new season. This phenomenon was associated with the widespread implementation of anti-epidemic measures in a pandemic. At the same time, the influence of SARS CoV-2 the effect on the circulation of ARVI pathogens has not been practically studied [13,14,17,18].

In connection with the above, the aim of the study was to study the epidemiological indicators of flu-like diseases during the coronavirus pandemic.

2. Material and Methods of Research

The work uses an epidemiological research method using a set of methodological approaches. Descriptive-evaluative and analytical techniques were used as part of epidemiological surveillance. For a comparative assessment of the main epidemiological characteristics of seasonal and pandemic influenza in a pandemic, a retrospective epidemiological analysis of the incidence of this infection was carried out. The long-term dynamics of the incidence of influenza and ARVI were studied, the long-term epidemic trend was determined. The study of the age, gender and social structure of influenza patients was carried out not only on the basis of official statistics, but also based on the results of an in-depth analysis of information about patients hospitalized in a specialized infectious hospital.

During the epidemiological analysis, the period of the rise in morbidity was considered 3 months: the month of the maximum incidence of influenza in the epidemic season under consideration, one preceding it and one following month.

In the course of the study, the results of operational epidemiological analysis for 4 epidemic seasons were studied, including data on the weekly incidence of influenza and ARVI in comparison with threshold values, the etiological structure of influenza and ARVI, and outbreak morbidity. The estimated epidemic thresholds for the incidence of influenza and ARVI in the epidemic seasons under consideration were established in accordance with the methodological recommendations. As part of the dissertation research, a retrospective clinical and epidemiological analysis of information on cases of influenza with a fatal outcome, as well as cases of influenza in pregnant women and newborns, was performed. A comprehensive assessment of official statistical information, extraordinary reports of

specialists of the Ministry of Health of the Republic of Uzbekistan was carried out.

3. Results and Discussion

The dynamics of morbidity rates in the seasons 2019/20, 2020/21, 2021/22 and the initial period of the season 2022/23 are analyzed.

Standard case definition of acute respiratory infection (ARI, ECDC/WHO):

- acute onset (last 10 days) with the presence of at least one of the respiratory symptoms:
- cough;
- sore throat;
- shortness of breath;
- runny nose/rhinitis
- as well as a clinical conclusion that the disease is caused by infection.

Standard definition of a case of influenza-like disease (GPZ) (WHO-2014).

ARI with the presence of the following signs:

- fever in the anamnesis or at the time of examination $>38^{\circ}\text{C}$;
- cough;
- start in the period of the previous 10 days.

Since the seasonal rise of influenza and acute respiratory infections (ARI), influenza activity has remained low throughout Uzbekistan. With ARI, an increase in morbidity was registered in the age groups 0-4 and 30-64 years. The highest incidence rates were recorded in the age group of 5-14 years, despite a decrease in incidence rates compared to 41 weeks. The incidence rates of ARVI for the described week were not recorded in the age group 65 years and older (Fig. 1-2).

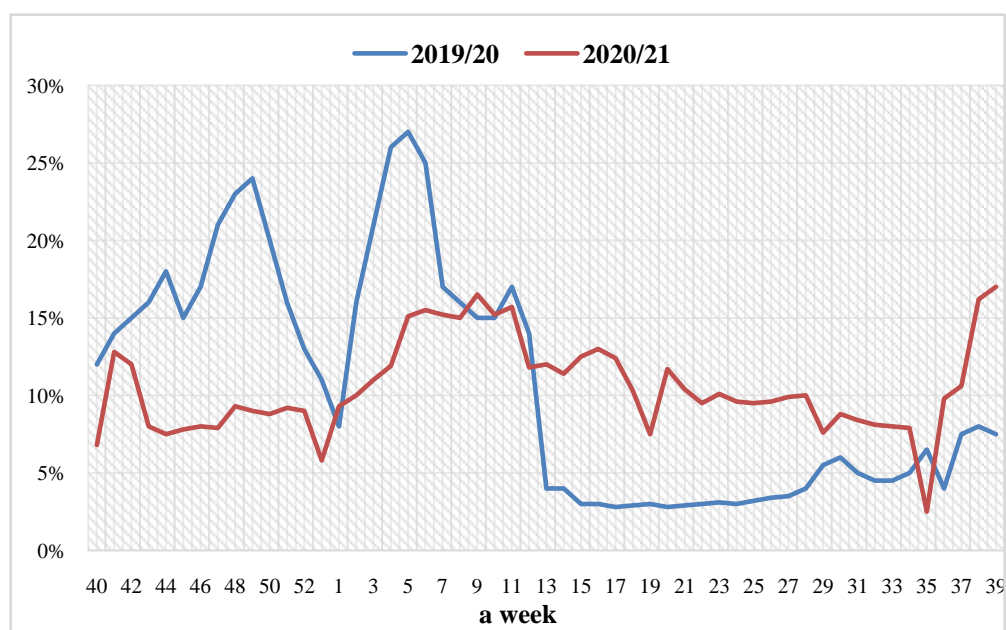


Figure 1. ARI incidence rate, comparison of 2019/20 and 2020/21 seasons per 10,000 population

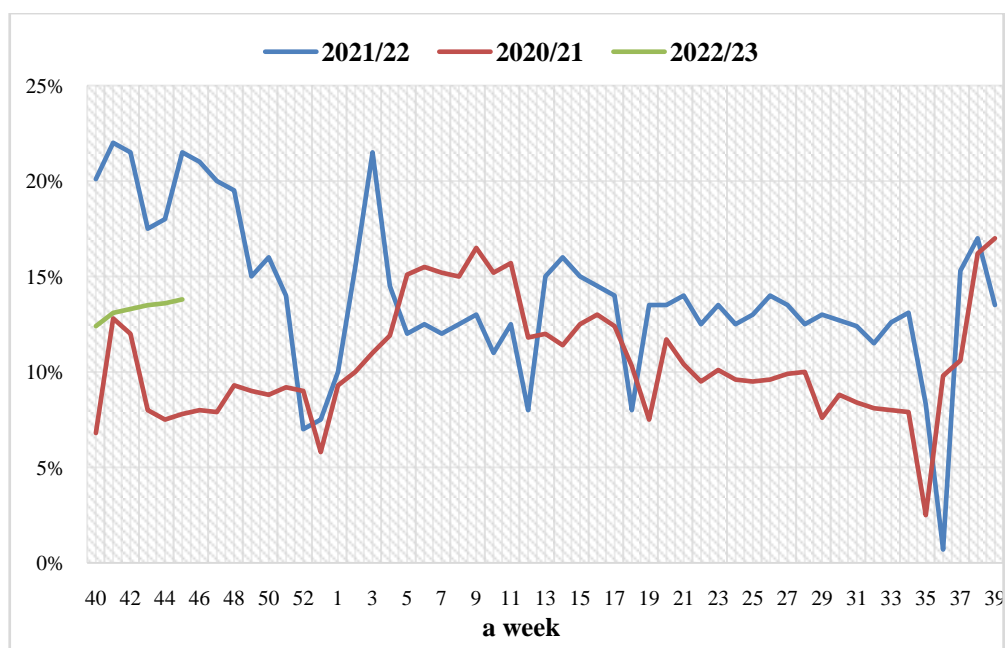


Figure 2. ARI incidence rate, comparison of seasons 2021/22 and 2020/21 per 10,000 population

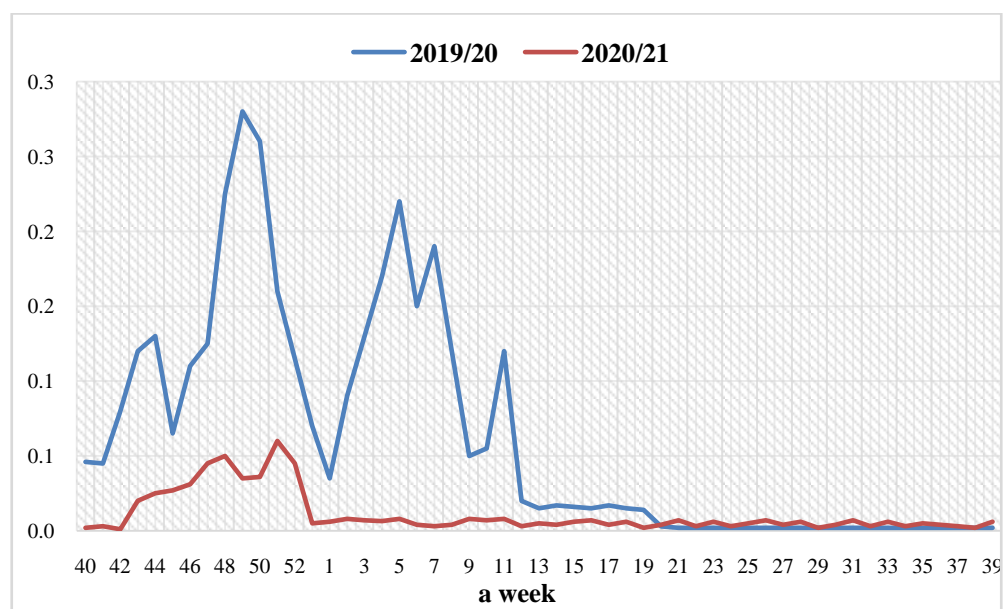


Figure 3. The incidence of influenza-like diseases, comparison of the 2019/20 and 2020/21 seasons per 10,000 population

Figure 3 shows an analysis of the dynamics of the incidence of influenza-like diseases in the form of a comparison of the seasons 2019/20 and 2020/21 per 10,000 population. For 11 months of 2020, the epidemic situation of influenza, compared with the same period of 2019, is characterized by a decrease in morbidity rates by 37.4%, acute respiratory infections by 13.1%. At the same time, there is an increase in the incidence of acute pneumonia by 37.4%.

In the 49th week of 2020, the morbidity rate of the population of the Republic of GPZ, compared to the 48th week, decreased by 38.7%, and compared to the same period of 2019, decreased by 9.3 times.

In the 44th week of 2022, the morbidity rates of the ILD population in the Republic, compared with the 43rd week, decreased by 37.5%, compared with the 44th week of 2021 by 67.7%. The largest number of cases of ILD was registered in the city of Tashkent (Fig. 4).

In the 42nd week of 2021, the incidence of acute respiratory viral infections in the republic decreased by 4.2% compared to the 41st week, and increased by 68% compared to the 42nd week of 2020.

The highest rates of acute respiratory viral infections this week were registered in Tashkent, Navoi, Tashkent and Khorezm regions. At week 42, the incidence of ARVI was 2.6% below the epidemic threshold.

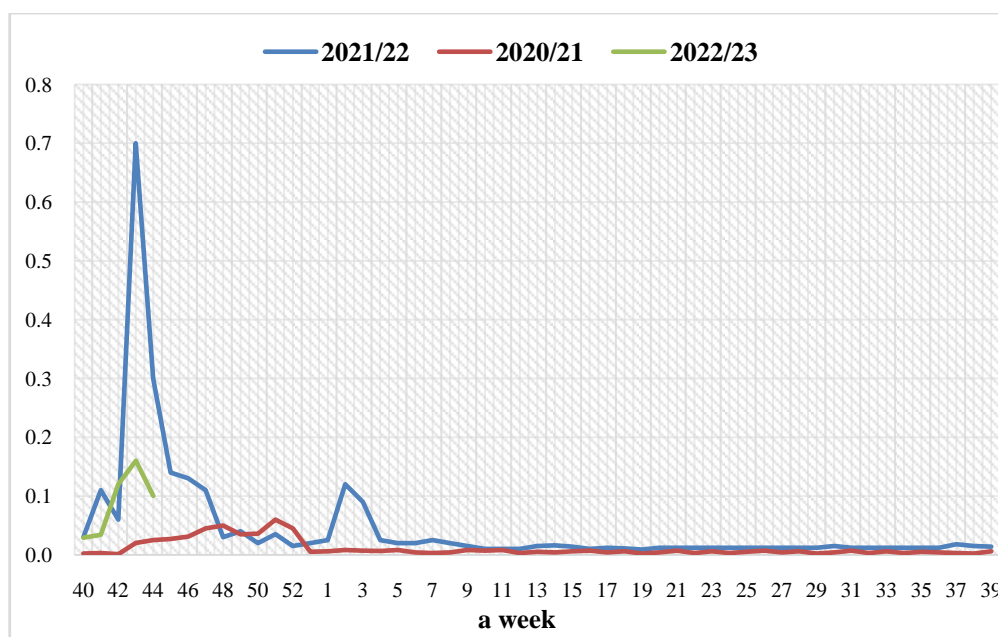


Figure 4. The incidence of influenza-like diseases, comparison of the seasons 2021/22 and 2020/21 per 10,000 population

The incidence of acute pneumonia in the 42nd week of 2021, compared with the 41st week, increased by 33.3%, compared with the 42nd week of last year, an increase of 9.1% was noted. The highest rates were registered in Tashkent, Syrdarya, Tashkent and Khorezm regions.

Thus, according to the results of the study, it was found that with the onset of the coronavirus pandemic in the Republic of Uzbekistan, there was a significant decrease in the incidence of ARVI. At the same time, the analyzed data cannot be considered absolutely reliable due to the fact that in the conditions of the pandemic it was not possible to perform appropriate serological detection of ARVI pathogens on a sufficient scale. Nevertheless, the results obtained are consistent with the results of foreign studies [13,14,15] and allow us to state that the circulation of a new highly contagious strain of the respiratory virus in the form of SARS-CoV-2 in a certain way suppresses other seasonal varieties of ARVI, which the population encounters on an ongoing basis annually. The study of the role of strengthening restrictive measures and the use of personal protective equipment during a pandemic deserves special attention in this matter, since they can be an equally important factor in reducing infection with seasonal ARVI pathogens. The data obtained serve as the basis for a deeper study of the causes of suppression of the incidence of acute respiratory viral infections against the background of a pandemic of coronavirus infection and interference of pathogens.

4. Conclusions

The results of the analysis revealed significant changes in the epidemiological indicators of influenza-like diseases during the coronavirus pandemic in the Republic of Uzbekistan, which were mainly manifested by a decrease

in morbidity against the background of an increase in the incidence of COVID-19. The data obtained indicate the probable presence of interference between the pathogens of COVID-19 and other acute respiratory infections. At the same time, this aspect requires a deeper study and assessment of the role of all factors associated with the current pandemic and capable of influencing the incidence of ARVI in the population.

REFERENCES

- [1] Atoeva M.A., Khayitov A.H. Influenza in a pandemic of coronavirus infection. *Infection, Immunity and Pharmacology*, No. 4, 2022, pp.53-57.
- [2] Cucinotta D, & Vanelli M. WHO Declares COVID-19 a Pandemic. *Acta bio-medica: Atenei Parmensis*. 2020; 91(1): 157–160. <https://doi.org/10.23750/abm.v91i1.9397>.
- [3] Pagliano P, Sellitto C, Conti V, Ascione T & Esposito S. Characteristics of viral pneumonia in the COVID-19 era: an update. *Infection*. 2021; 49(4): 607–616. <https://doi.org/10.1007/s15010-021-01603-y>.
- [4] Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ. China Medical Treatment Expert Group for COVID-19. Clinical Characteristics of Coronavirus Disease 2019 in China. *The New England journal of medicine*. 2020; 382(18): 1708–1720. <https://doi.org/10.1056/NEJMoa2002032v>.
- [5] Sominina AA, Danilenko DM, Stolyarov KA, etc. Interference of SARS-CoV-2 with other pathogens of respiratory viral infections during the pandemic. *Epidemiology and Vaccination Prevention*. 2021; 20(4): 28–39.
- [6] Usenko DV, Thakushinova NH, Shaturina TT, etc. Acute respiratory infections and influenza during the COVID-19 pandemic — what to prepare for in the 2021-2022 season? *Medical review*. 2021; 5(11): 721–727.

- [7] Maglione M, Pascarella A, Botti C, Ricci G, Morelli F, Camelia F, Micillo A, Calì C, Savoia F, Tipo V & Giannattasio A. Changing Epidemiology of Acute Viral Respiratory Infections in Hospitalized Children: The Post-Lockdown Effect. *Children* (Basel, Switzerland). 2022; 9(8): 1242. <https://doi.org/10.3390/children9081242>.
- [8] Leaver BA, Smith BJ, Irving L, Johnson DF & Tong SYC. Hospitalisation, morbidity and outcomes associated with respiratory syncytial virus compared with influenza in adults of all ages. *Influenza and other respiratory viruses*. 2022; 16(3): 474–480. <https://doi.org/10.1111/irv.12909>.
- [9] Groves HE, Piché-Renaud PP, Peci A, Farrar DS, Buckrell S, Bancej C, Sevenhuysen C, Campigotto A, Gubbay JB & Morris SK. The impact of the COVID-19 pandemic on influenza, respiratory syncytial virus, and other seasonal respiratory virus circulation in Canada: A population-based study. *Lancet regional health. Americas*. 2021; 1; 100015. <https://doi.org/10.1016/j.lana.2021.100015>.
- [10] Chow EJ, Uyeki TM & Chu HY. The effects of the COVID-19 pandemic on community respiratory virus activity. *Nature reviews. Microbiology*, 2022: 1–16. <https://doi.org/10.1038/s41579-022-00807-9>.
- [11] Yum S, Hong K, Sohn S, Kim J & Chun BC. Trends in Viral Respiratory Infections During COVID-19 Pandemic, South Korea. *Emerging infectious diseases*. 2021; 27(6): 1685–1688. <https://doi.org/10.3201/eid2706.210135>.
- [12] Avolio M, Venturini S, De Rosa R, Crapis M, Basaglia G. Epidemiology of respiratory virus before and during COVID-19 pandemic. *Le infezioni in medicina*. 2022; 30(1): 104–108. <https://doi.org/10.53854/liim-3001-12>.
- [13] Trinh JT & Zeng L. Virus interactions: cooperation or competition?. *Future microbiology*. 2017; 12: 561–564. <https://doi.org/10.2217/fmb-2017-0048>.
- [14] Gomez GB, Mahé C & Chaves SS. Uncertain effects of the pandemic on respiratory viruses. *Science* (New York, N.Y.). 2021; 372(6546): 1043–1044. <https://doi.org/10.1126/science.abh3986>.
- [15] Tang JW, Bialasiewicz S, Dwyer DE, Dilcher M, Tellier R. Where have all the viruses gone? Disappearance of seasonal respiratory viruses during the COVID-19 pandemic. *J Med Virol*. 2021; 93(7): 4099–4101. <https://doi.org/10.1002/jmv.26964>.
- [16] Poole S, Brendish NJ & Clark TW. SARS-CoV-2 has displaced other seasonal respiratory viruses: Results from a prospective cohort study. *The Journal of infection*. 2020; 81(6): 966–972. <https://doi.org/10.1016/j.jinf.2020.11.010>.
- [17] Atoeva M.A., Khayitov A. Kh. Features of the circulation of the influenza virus in the conditions of a pandemic. *Science Asia* 48 (2022): 513–516. doi:10.2306/scienceasia513-343.2022. SE1816 <https://www.scienceofasia.org/abstract/abstract%3D135>.
- [18] Khayitov A.H., Atoeva M.A. Structure of acute respiratory viral infections during the pandemic in the Republic of Uzbekistan. *Bulletin of the Tashkent Medical Academy*. No. 3(2), 2023. pp.190–194. www.tma-journals.uz.