INFECTIOUS SAFETY IN THE CONTEXT OF THE COVID-19 PANDEMIC: INTERSTATE EXPERIENCE OF INTERACTION

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ABSTRACT

The article presents the results of joint activities of expert epidemiological groups of Russia and Uzbekistan on the organization of measures to counteract the spread of the SARS-CoV-2 virus in medical institutions and reduce nosocomial infection among medical personnel.

The study aims to identify the main causes of the increase in hospital-acquired COVID-19 infection in the Republic of Uzbekistan and develop an action plan to reduce the incidence of coronavirus infection caused by the SARS-CoV-2 virus among medical staff.

Keywords: pandemic, COVID-19, infectious safety, Polymerase chain reaction(PCR), SARS-CoV-2, nosocomial infection.
I. INTRODUCTION

An expert group of epidemiologists and clinicians from Russia and Uzbekistan worked to organize measures to counteract the spread of the SARS-CoV-2 virus (in August and September 2020). Experts evaluated the organization and effectiveness of anti-epidemic measures. The group's key task was to find ways to reduce the intensity of the spread of a new coronavirus infection [1-3].

Anti-epidemic work began in January 2020 in the Republic of Uzbekistan. The government and the president of the country instructed to create a Republican special commission. The Agency of Sanitary and Epidemiological Welfare of the Republic of Uzbekistan organized an operational headquarters, whose tasks included developing and approving an action plan to prevent the import and spread of new coronavirus infection, issued 6 Resolutions of the Chief State Sanitary Doctor of the Republic of Uzbekistan. The disease's first case was detected on March 15, 2020, in the Republic with a coronavirus infection caused by the SARS-CoV-2 virus. Since the beginning of June, an intensive increase was noted; the maximum number of new cases was registered on August 04 – 981 patients with deaths from 3 to 7 per day.

Information was collected through an electronic system; 42437 (0.12% of the total population – 34 036 800 people) cases of COVID-19 were registered on 02.09.2020, 327 (0.77%) were fatal, 39863 recovered, 2248 people were treated. A feature of the country that affects the spread of infection is the presence of a land border with Kazakhstan, Turkmenistan, Tajikistan, Kyrgyzstan and Afghanistan, from where an additional influx of infected people is possible. Measures to limit the spread of infection from other countries in the territory were implemented using 53 sanitary control points 11-at international airports; 35-at road stations; 6-at railway junctions; 1 - at a river port.

During the spread of the epidemic, quarantine centres were organized to accommodate citizens who arrived on the Republic's territory from other countries, and international communication is limited. About 80 somatic hospitals were converted to the existing infectious diseases hospitals, with a capacity of more than 5,000 beds. Two specialized hospitals were built in Tashkent region with 4,000 beds. Two distribution centres were organized based on the exhibition complexes "Uzexpocenter " in Tashkent and "Bagishamal" in Samarkand for primary diagnostics.

Mobile groups consisting of a general practitioner, an infectious disease specialist, an epidemiologist and a disinfection specialist were created based on outpatient clinics. These groups were designed to identify patients with COVID-19, determine the need for hospitalization or the possibility of outpatient treatment, and identify contact persons [4, 5]. Despite the measures taken, the unfavourable epidemic situation persisted, which was the reason for seeking help from the Russian Federation.

The study aims to identify the main causes of the spread of COVID-19 within hospitals and develop an action plan to reduce medical staff incidence.

II. MATERIALS AND METHODS

The organization of anti-epidemic measures in 14 health care institutions in Tashkent and Samarkand and Tashkent and Samarkand regions was analyzed: in 7 laboratories, 6 hospitals and 1 polyclinic. The routes of personnel movement, the peculiarities of the organization of disinfection tunnels, personal protective equipment, ventilation systems, and airlocks organization were studied.

III. RESULTS AND DISCUSSION

The analysis of the epidemiological situation showed the main causes leading to the spread of infection among the population and contributing to the increase in the number of severe and extremely severe forms, cases of prolonged course, long hospital stay (Table 1).

The main reason was the lack of equipped airlocks between the "red" and "green" zones for the safe removal of personal protective equipment (PPE) by medical personnel with the possibility of full disinfection. The absence of disinfectants in some hospitals and the lack of air disinfection equipment increased the risk of an increase in the infectious dose.

There was no clear division into "red" and "green" zones, which caused medical personnel's movement without disinfection to departments where employees did not use PPE in some hospitals and laboratories. The peculiarities of the working schedule, which did not differ from the usual one and allowed the medical staff to rest at
permanent residence, including without limiting contacts with relatives, contributed to the spread of COVID-19. In several hospitals, there were no separate sites for the disinfection treatment of vehicles. Carrying out disinfection of cars outside of specially allocated places led to contact of the medical personnel leaving "green" zones with the persons accompanying patients.

Another apparent reason was the wrong choice of PPE: the use of low-class protective suits made of materials that do not provide insulation of the skin, often – the lack of eye protection, loose fit of respirators and masks. Attention was drawn to the use of respirators with an exhalation valve in the presence of respiratory infection symptoms by medical personnel. At the same time, employees who already had a coronavirus infection were much more likely not to use the necessary PPE. At the same time, after contact with patients, the staff of institutions can become a source of infection with possible contact transmission due to the virus's presence on clothing, hair, and skin.

When visiting hospitals, attention was drawn to the fact that many patients were hospitalized with COVID-19 again. Simultaneously, in the presence of a diagnosis of community-acquired pneumonia, laboratory diagnostics for the presence of the SARS-CoV-2 virus was carried out only in some cases. Hospitalization of such patients was carried out in converted rooms designed for 400-500 people, with no isolation between compartments, common corridors and a common sub-floor space [4, 5, 6].

<table>
<thead>
<tr>
<th>№ п/п</th>
<th>Causes of the COVID-19 spread</th>
<th>Efforts to eliminate the causes</th>
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<tbody>
<tr>
<td>1</td>
<td>Lack of equipped gateways for safe removal of PPE</td>
<td>Allocation of equipped areas with a sufficient number and volume of containers with disinfectants, installing equipment for disinfection of personnel with liquid disinfectants. Installation of air disinfection equipment (recirculation). Marking and full isolation of &quot;red&quot; and &quot;green&quot; zones.</td>
</tr>
<tr>
<td>2</td>
<td>Lack of special platforms for disinfection of transport</td>
<td>Allocation and equipment of particular isolated sites</td>
</tr>
<tr>
<td>3</td>
<td>Incorrect choice of PPE</td>
<td>Providing PPE of the required protection class: suits/overalls of class 5/6, FFP2 or FFP3 respirators, anti-plague suits of type 1</td>
</tr>
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<td>4</td>
<td>Lack of PPE for some health workers in &quot;red&quot; zones</td>
<td>Training of medical staff</td>
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<tr>
<td>5</td>
<td>Moving from the &quot;red zone&quot; to the &quot;green zone&quot; without using a gateway, removing and disinfecting used PPE</td>
<td>Marking areas, training of staff</td>
</tr>
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</table>

In general, most of the identified causes were easily remedied on the ground without high economic costs. Of course, there were the greatest technical difficulties in the converted hospitals for the organization of gateways between the "red" and "green" zones. However, experience showed that a solution to this problem could be found in all cases. The most difficult task was to provide additional laboratory equipment and trained personnel for PCR diagnostics.

The joint analysis of the interstate working group revealed the need to correct anti-epidemic measures. As a result of the final inspection, the following proposals were formulated.

1. Organize disinfection tunnels for adequate disinfection at the exit from the departments and buildings and monitor their condition. Equip airlocks for removing and disinfecting PPE with control overfilling and timely replacement of Class B waste bags. Ensure air disinfection in tunnels and airlocks with decontamination recirculators.

2. Mark the dirty and clean areas and the containers used, with information about the products contained in them.
3. Distribute the flow of personnel who were responsible for studying the material, conducting the stage of analysis and initial preparation of samples in the microbiological safety boxes, decontamination of wastewater, safe waste management.

4. Allocate separate sites for disinfection treatment of sanitary transport.

5. Provide personnel with personal protective equipment of the required level (suits/overalls of class 5/6, FFP2/3 respirators, eye protection), including for persons with COVID-19. Conduct training on the need and rules for the use of PPE.

6. Conduct a survey for the presence of the SARS-CoV-2 virus in persons diagnosed with community-acquired pneumonia, in foci of group morbidity with respiratory infections, and medical workers one time in 7-10 days.

IV. CONCLUSION

The implementation of the recommended measures: in the medical institutions of the Republic, first of all, the allocation of equipped airlocks for disinfection, the use of effective personal protective equipment, the distribution of the flow of personnel, the isolation of contact persons for a period of at least 14 days before twice receiving a negative test result for the SARS-CoV-2 virus, led to a significant improvement in the overall epidemic situation. The total number of infected people in the Republic of Uzbekistan decreased from 3,686 on August 23 to 2,335 on October 27. Despite the increase in neighbouring countries, the length of hospital stays and occupied beds decreased. Thus, infectious safety within medical institutions is one of the main links of security within the country.

CONFLICT OF INTERESTS AND CONTRIBUTION OF AUTHORS

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