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Clinical Features of COVID-19 in Uzbekistan

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ABSTRACT

Background: As of April 30, 2020, a total of 2,039 cases of the novel coronavirus disease 2019 (COVID-19) were confirmed in the Republic of Uzbekistan after the first detection on March 15. Reports on symptoms of COVID-19 are non-specific and known to vary from asymptomatic, mild to severe, or fatal. This study aimed to analyze the symptomatic and clinical characteristics of study participants based on the medical records of participants hospitalized with COVID-19 in Uzbekistan.
Methods: We collected all data from medical records of COVID-19 confirmed patients in 19 hospitals from 13 regions of Uzbekistan between March 15 and April 30. We selected 1,030 patients discharged from the hospitals after COVID-19 treatment as study participants, excluding those with missing data. Further, we collected demographics, symptoms, clinical outcomes, and treatment data through medical records.
Results: More than half (57.6%) of confirmed cases of COVID-19 were males, and the median age was 36.0 years. The most frequent symptoms at the first inspection on hospital admission of all patients were fatigue (59.7%), dry cough (54.1%), pharyngalgia (31.6%), headache (20.6%), and anorexia (12.5%). Compared to the oldest group, the youngest group showed a lower frequency of symptoms. About half of the group aged 18–49 years reported that they came from abroad. One-fifth of patients in group 50–84 received oxygen support, while no patients in group aged 0–17 years received oxygen support. About two-thirds of the participants from intensive care unit (ICU) came from abroad, whereas 42.1% of the non-ICU group returned from other countries. Regarding symptoms, 16.9% of the patients in the ICU group were asymptomatic, while 5.8% in the non-ICU group were asymptomatic.
Conclusion: This study suggests that the medical delivery system and resource distribution need to be implemented based on clinical characteristics by age and severity to delay and effectively respond to the spread of infections in the future. This study analyzed symptoms of COVID-19 patients across Uzbekistan, which is useful as primary data for policies on COVID-19 in Uzbekistan.

Keywords: COVID-19; SARS-CoV-2; Characteristics; Uzbekistan

Disclosure

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: Choi JW, Habibulla A, Tuychiev L, Rakhimov B. Methodology: Choi JW, Habibulla A, Tuychiev L, Rakhimov B. Formal analysis: Kim KH, Moon J. Data curation: Rakhimov B, Moon J. Validation: Rakhimov B. Investigation: Habibulla A, Tuychiev L, Rakhimov B. Writing - original draft: Kim KH, Moon J, Choi JW, Min KS. Writing - review & editing: Moon J, Kim KH, Choi JW.

INTRODUCTION

The World Health Organization (WHO) declared the coronavirus disease 2019 (COVID-19) outbreak a Public Health Emergency of International Concern (PHEIC) on January 30, and a pandemic on March 11, 2020. The PHEIC declaration is the 6th time the WHO has declared a PHEIC since the International Health Regulations (IHR) came into force in 2005.[1,2] As of June 19, there were 10,193,723 confirmed cases of COVID-19 and the death toll reached 503,867 worldwide.[3]

Reports on symptoms of COVID-19 are non-specific and known to vary from asymptomatic or mild to severe or fatal.[4] The symptoms of 1,000 patients hospitalized with COVID-19 in New York were in the order of cough (73.2%), fever (72.8%), and dyspnea (60.1%). Studies conducted in China mainly reported fever, dry cough, myalgia, fatigue, dyspnea, and anorexia, and rare cases of diarrhea.[5,6] As a result of comparing the clinical symptoms of 36 children with COVID-19 in China to those of adults, there was a difference in the onset of symptoms such as fever (36% for children and 86% for adults), and the proportion of children with no symptoms was higher than that of adults.[7] A study conducted in Daegu, Korea reported that prognostic factors such as body temperature above 37.8°C, diabetes mellitus were independent predictors of severe cases of COVID-19, stressing assessment of the factors and appropriate interventions in high-risk group.[8] Based on these findings, we can infer that clinical symptoms and prognosis vary depending on age and severity of patients who test positive for COVID-19.

The majority of prior studies took place in China, Korea, and the United States, wherein they were limited to analyzing the outbreak or transmission in a hospital or a specific region. The Organization for Economic Cooperation and Development reported that some countries in Central Asia mitigated the effects of COVID-19 through strict lockdown regimes for some populations. As of the first week of May, when COVID-19 cases surged worldwide, mortality per million was 1.9 in Afghanistan, 1.5 in Kyrgyzstan, 1.3 in Kazakhstan, and 0.3 in Uzbekistan, which were far below those in Germany (79.4), France (379.3), Italy (474.8), or Spain (540.4).[9] A study conducted in Kazakhstan analyzed the incidence, mortality, case-fatality rates, and predictive modeling, but lacked information on the clinical symptoms of COVID-19 patients.[10]

In Uzbekistan, the target country of this study, the first COVID-19 confirmed cases were reported on March 15, 2020. In total, 5,697 confirmed cases and 19 deaths have been reported as of June 19. Uzbekistan quarantined all schools, kindergartens, and universities on March 16. From March 15 to May 31, the number of confirmed cases continued to increase with several peaks (**Fig. 1**). Self-isolation in Tashkent, Nukus, and regional centers became mandatory, and it was forbidden to leave home, except in cases of emergency from April 6. Despite the strengthening of quarantine, the highest peak was on April 14. The daily curve of the number of new cases among study participants was affected by the number of those returned from other countries. The number of participants from abroad peaked on March 27, April 5, and April 9, similar to the trend of the total number of new cases in other regions. After the highest peak, we observed the similarity between total cases and domestic infection on April 17 and April 25.

The cumulative number of confirmed cases in Uzbekistan, Norway and Malaysia as of June 30 were similar, however the case fatality rate of COVID-19 in Uzbekistan was 0.3%, lower than

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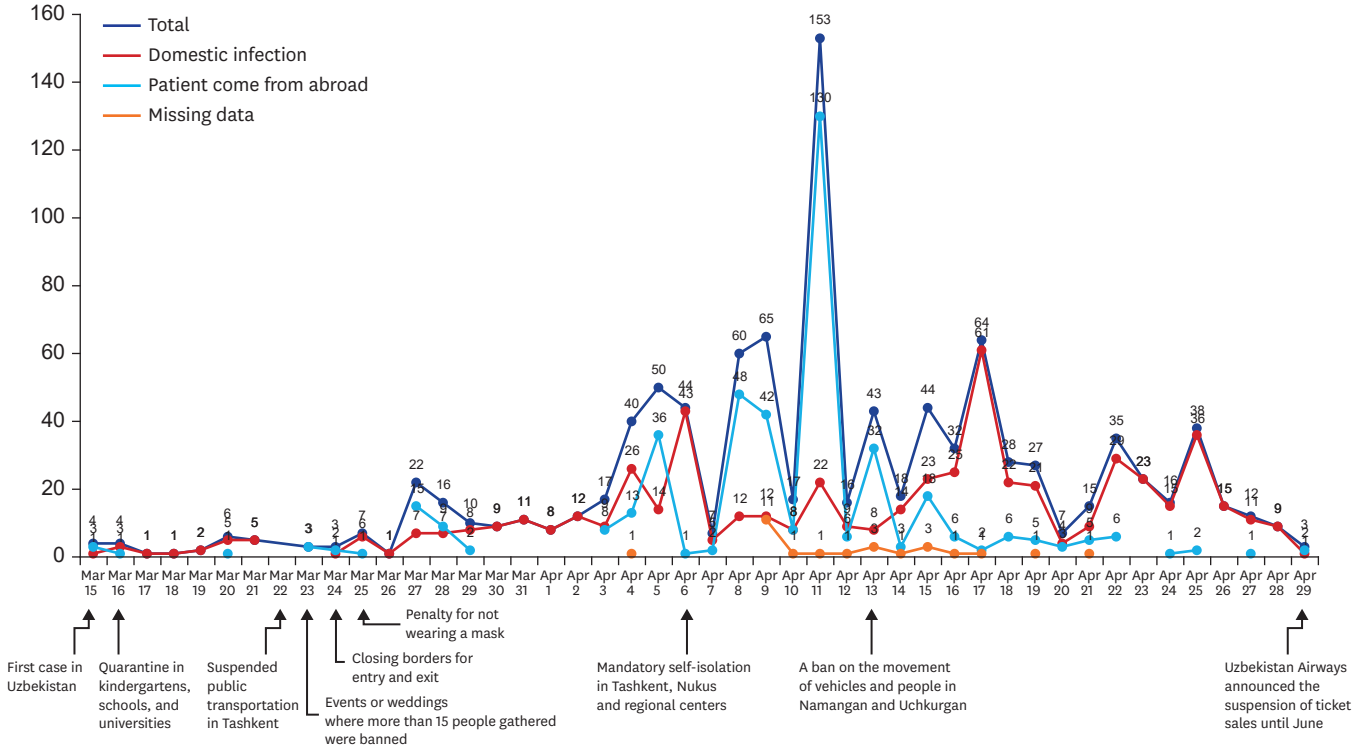

Fig. 1. The curve of the daily number of new cases among study participants by international exposure and national responses in the Republic of Uzbekistan (n = 1,030).

that of Norway (2.8%) and Malaysia (1.4%).[3] Uzbekistan is also one of the leading countries that applied intensive social distancing policies. To prevent the transmission of COVID-19, Uzbekistan imposed strict lockdowns, implemented border control measures, and added 10,000 hospital beds in Tashkent to address the shortage of beds. From the beginning of the pandemic to late June, all confirmed cases in Uzbekistan were hospitalized to hospitals dedicated to COVID-19 even if they had no symptoms. This study aimed to investigate the symptoms and clinical characteristics of COVID-19 by age group and intensive care unit (ICU) group of Uzbekistan patients at the beginning of pandemic so that the findings of the study can be used to strengthen the response to COVID-19.

METHODS

Study setting

In accordance with the Presidential Decree No. R-5537, the Special Republican Commission (SRC) was formed under the Prime Minister to prevent the inflow and spread of COVID-19 in Uzbekistan.[11] The main role of the SRC was to make major decisions and assign each task to government departments. The Central Headquarters for Combating COVID-19 was set up under each ministry to implement the order of SRC. The Central Headquarter under the Ministry of Health designated 19 specialized hospitals to provide COVID-19 treatment to confirmed cases in all regions: 12 regions, Republic of Karakalpakstan (autonomous republic), and Tashkent city (independent city). At the beginning of the pandemic, all confirmed patients were immediately admitted to the hospitals dedicated to treat COVID-19 regardless of symptoms. Since late June, mobile teams of general practitioners, infectious disease specialists and epidemiologists were organized in all districts due to a lack of beds at the 19 hospitals.

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COVID-19 testing in Uzbekistan was conducted free of charge at Sanitary and Epidemiological Agency (SEA) under the Ministry of Health. If positive results were reported in the test, patient data was sent to the regional SEA through the district level. SEA collected the information and reported to the Central Headquarters under the Ministry of Health.

Study design and participants

We retrospectively collected and analyzed the medical records of 1,030 hospitalized patients from 19 hospitals in 12 regions, Republic of Karakalpakstan, and Tashkent city of the Republic of Uzbekistan between March 15 and April 30. It's a cross-sectional study, however, there are variables that can suggest causative factors associated with COVID-19 because the medical records of the patients have been reviewed. We defined a COVID-19 case as a person with a positive result on real-time reverse transcription-polymerase chain reaction, according to the WHO interim guidance.

Data collection

Researchers collected all data from medical records of hospitalized COVID-19 patients from 19 hospitals in Uzbekistan. The records include demographics, symptoms, and findings on admission, and treatment data during the hospitalization period. To ascertain the information not in the medical records, researchers directly checked with patients or their family members. Patient data between 15 March and 30 April was collected by researchers from 22 April to 5 May. One individual from each hospital collected patient data and medical records, and the data was delivered to the Tashkent Institute of Postgraduate Medical Education. To improve the data quality, two researchers from the institute separately checked the data. The senior researcher of this study also double-checked the raw data twice and made some modifications. The medical data were analyzed by the researchers from the Institute of Occupational and Environmental Health, Korea University.

Health statistics of Uzbekistan usually divide the age category into 0–14, 15–17, and adults. Based on a previous study regarding hospitalized patients, the age groups in this study were divided into 0–17, 18–49 and 50–84 years.[12] Uzbekistan consists of 12 regions, one autonomous republic (Republic of Karakalpakstan), and one independent city (Tashkent city). The region in this study was divided based on geographical proximity as follows: the western region (Republic of Karakalpakstan, Khorezm and Navoi), the southern region (Bukhara, Samarkand, Jizzak, Syrdarya, Kashkadarya and Surkhandarya), and the eastern region (Tashkent, Namangan, Fergana and Andijan). Patients were asked if they had traveled abroad recently to check international exposure.

Clinical outcomes of study participants were followed up until April 30, 2020. The day when the symptom was first noticed was defined as the date of disease onset. The criteria for 'asymptomatic' means when patient has positive results but does not show clinical symptoms or pathological changes, following the definition of the Interim recommendation of the Ministry of Health for the management of patients infected with COVID-19 (fifth version). The symptoms included temperature above 38°C, cough, nausea, vomiting, diarrhea, headache, etc.[13] The categories of body temperature were below 37.3°C, 37.3–38.0°C and above 38.0°C, following previous studies.[14,15] The study could not include diastolic blood pressure because only systolic blood pressure was included in medical records of Uzbekistan's hospitals, and the systolic blood pressure range was divided by 6 levels.[16] Evidence related to respiration rate suggests that a rate exceeding 24 per minute is probably critical status, thus the criterion of that rate was used 24 per minute.[17] The types of therapies

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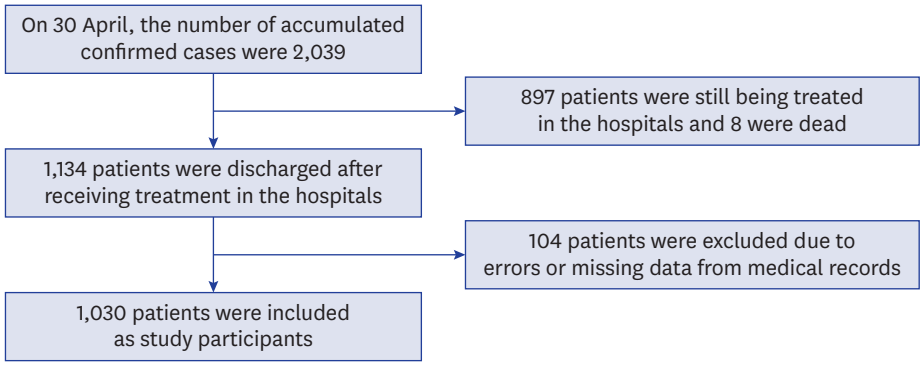

Fig. 2. Flow of sample selection.

provided to the patients were classified as antiviral, antibiotic, immunoglobulin and glucocorticoid therapy, and oxygen support. There was no data on how many times the patients were admitted to ICU in medical records. Thus, we only analyzed whether patients were admitted to the ICU or not.

The flow of study participants

The cumulative number of confirmed cases by April 30 and hospitalized in COVID-19 hospitals was 2,039 in Uzbekistan.[3] The criteria for hospitalization was a positive result of diagnostic tests regardless of symptoms. Of the 2,039 patients, 1,134 were discharged after a full recovery from COVID-19, while 897 were still under treatment in hospitals, and the other eight died. Only 1,030 of 1,134 were selected as study participants, excluding 104 cases owing to incomplete data or medical record errors (**Fig. 2**).

Statistical analysis

We presented continuous variables as median (interquartile range [IQR]) and categorical variables as number (%). Further, we used the median with IQR, considering the skewed distribution of the data. Categorical variables were analyzed using the χ^2 test. If the variable had more than 20% of all cells with an expected count of less than 5, Fisher's exact test was applied instead of the χ^2 test. Differences in continuous variables between age groups were analyzed using the analysis of variance test. We considered all tests statistically significant when the *P* value was less than 0.05. Statistical analyses were performed using SPSS version 24 (IBM Corp., Armonk, NY, USA).

Ethics statement

The Ministry of Health in Uzbekistan collected data to identify the clinical features of confirmed cases, and this study's researchers received secondary data from the Ministry. No identifying information such as name, date of birth, or registration number was collected. The Korea University Institutional Review Board (IRB) approved the protocol for this study after reviewing the ethical review exemption (IRB No. KUIRB-2020-0161-01).

RESULTS

Demographic and clinical characteristics of the study participants

Between March 15 and April 30, a total of 1,030 COVID-19 participants were discharged from hospitals designated for COVID-19 treatment, as shown in **Table 1**. Among them, 588

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participants (57.6%) were male, and the median age was 36.0 years (IQR 26.0–47.0). More than half of the participants lived in eastern region including Tashkent and Namangan. The median duration from the first symptoms to diagnosis was 2.0 days (IQR 1.0–3.0). Concerning the international exposure by traveling abroad, less than half (42.3%) came from abroad, and about half (57.7%) were domestically infected in Uzbekistan. Most (91.1%) participants experienced symptoms, and the majority (83.3%) had a temperature lower than 37.3°C. Less than half (48.4%) of the participants had normal systolic pressure, whereas most (95.5%) had a respiratory rate of less than 24 per minute.

Table 1. Demographic and baseline characteristics of the study participants (n = 1,030)

Variables	Values
Sex (n = 1,020)	
Male	588 (57.6)
Female	432 (42.4)
Age, yr (n = 540)	36.0 (26.0–47.0)
0–17	46 (8.5)
18–49	380 (70.4)
≥ 50	114 (21.1)
Region	
Eastern region	565 (54.8)
Southern region	345 (33.5)
Western region	120 (11.7)
Duration from first symptoms to diagnosis, day (n = 936)	2.0 (1.0–3.0)
Traveling abroad (n = 1,004)	
No	579 (57.7)
Yes	425 (42.3)
Asymptomatic case (n = 936)	
Asymptomatic	83 (8.9)
Symptomatic	853 (91.1)
Temperature, °C (n = 945)	36.6 (36.5–36.8)
< 37.3	787 (83.3)
37.3–38.0	129 (13.7)
≥ 38.1	29 (3.0)
Systolic pressure, mmHg (n = 973)	110 (110–120)
Low (< 90)	31 (3.2)
Normal (90–119)	471 (48.4)
Elevated (120–129)	415 (42.7)
Hypertension state 1 (130–139)	34 (3.5)
Hypertension state 2 (140–179)	21 (2.1)
Hypertensive crisis (≥ 180)	1 (0.1)
Respiratory rate, per minute (n = 963)	20 (18–21)
≤ 24	920 (95.5)
≥ 25	43 (4.5)
Symptoms	
Fatigue	615 (59.7)
Dry cough	557 (54.1)
Pharyngalgia	325 (31.6)
Headache	212 (20.6)
Anorexia	129 (12.5)
Dyspnea	91 (8.8)
Expectoration	75 (7.3)
Abdominal pain	68 (6.6)
Diarrhea	60 (5.8)
Nausea	55 (5.3)
Vomiting	40 (3.9)
Dizziness	39 (3.8)

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Table 1. (Continued) Demographic and baseline characteristics of the study participants (n = 1,030)

Variables	Values
Antiviral therapy	647/693 (93.4)
Lopinavir	3/279 (1.1)
Interferon	13/288 (4.5)
Arpeflu	590/666 (88.6)
Other antiviral drugs	479/552 (86.8)
Antibiotic therapy	988/996 (99.2)
Hydroxychloroquine	651/762 (85.4)
Chloroquine	92/382 (24.1)
Azithromycin	924/971 (95.2)
Other antibiotics	558/698 (79.9)
Immunoglobulin therapy	354/523 (67.7)
Immunoglobulin	11/281 (3.9)
Other drugs	354/523 (67.7)
Glucocorticoid therapy	37/460 (8.0)
Oxygen support	29/448 (6.5)
Oxygen inhalation	28/449 (6.2)
Non-invasive ventilation	12/440 (2.7)
Invasive mechanical ventilation	4/434 (0.9)

Data are number (%) or median (interquartile range). The difference between the total number of participants (1,030) and the total number of respondents by each variable is due to the missing values for the variable.

The most frequent symptoms at the first inspection after hospital admission were fatigue (59.7%), dry cough (54.1%), pharyngalgia (31.6%), headache (20.6%), and anorexia (12.5%). Most participants received antiviral therapy (93.4%) and antibiotic therapy (99.2%). Two-thirds (67.7%) of the patients received immunoglobulin therapy, while a few participants had glucocorticoid therapy (8%) and oxygen support (6.5%).

Demographic and clinical characteristics by age group

Table 2 shows demographic and baseline characteristics of the study participants by age group. Only 540 of 1,030 participants had data about age; 46 participants were aged 17 years or younger, 380 were aged 18–49 years, and 114 were aged 50–84 years. Sex ($P = 0.009$), traveling abroad ($P < 0.001$), systolic pressure ($P < 0.001$), and respiratory rate ($P = 0.014$) significantly differed by age group. The proportion of male in the group aged 18–49 was 62.0%, higher than the group aged 0–17 (39.1%), and the group aged 50–84 (55.3%). Most patients in the 0–17 group (97.8%) and 50–84 group (79.8%) were domestically infected, while about half (50.7%) 18–49 group had no international exposures. The 50–84 age group (33.0%) showed a lower proportion of normal systolic pressure, compared to the 0–17 (58.8%) and 18–49 groups (46.8%). Only a few patients aged 18–49 (4.6%) and 50–84 (7.5%) had more than 24 respiratory rates per minute, compared to patients aged 0–17 (15.2%).

In the group younger than 17 years, dry cough (39.1%), fatigue (28.3%), pharyngalgia (26.1%), anorexia (13.0%), and headache (6.5%) were major symptoms. Main symptoms of participants aged 50–84 years were dry cough (58.8%), fatigue (51.8%), pharyngalgia (35.1%), anorexia (27.2%), dyspnea (15.8%) and headache (14.0%). No one took glucocorticoid therapy and oxygen support in the group aged 0–17 years. Most patients in the group under the age of 17 received antiviral therapy (95.1%), antibiotic therapy (100%), and immunoglobulin therapy (90.6%). Most patients in the group of 50–84 years received antiviral therapy (84.6%), antibiotic therapy (100%), and immunoglobulin therapy (77.0%). About one-fifth (15.4%) of the oldest group received glucocorticoid therapy and oxygen support (20%), while nobody received those therapies in the youngest group.

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Table 2. Characteristics of the study participants by age group (n = 540)

Variables	Age group, yr			
	0–17 (n = 46)	18–49 (n = 380)	50–84 (n = 114)	*P* value
Sex (n = 539)				0.009
Male	18 (39.1)	235 (62.0)	63 (55.3)	
Female	28 (60.9)	144 (38.0)	51 (44.7)	
Traveling abroad (n = 533)				< 0.001
No	45 (97.8)	189 (50.7)	91 (79.8)	
Yes	1 (2.2)	184 (49.3)	23 (20.2)	
Duration from first symptoms to diagnosis, day (n = 470)	2.0 (1.0–4.0)	2.0 (1.0–4.5)	2.0 (1.0–6.0)	0.434
Asymptomatic case (n = 466)				0.052
Asymptomatic	5 (14.3)	22 (6.3)	2 (2.4)	
Symptomatic	30 (85.7)	327 (93.7)	80 (97.6)	
Temperature, ˚C (n = 481)	36.7 (36.4–36.8)	36.6 (36.5–36.8)	36.7 (36.5–37.0)	0.722
< 37.3	37 (84.1)	278 (83.7)	83 (79.0)	
37.3–38.0	5 (11.4)	43 (13.0)	16 (15.2)	
≥ 38.1	2 (4.5)	11 (3.3)	6 (5.8)	
Systolic pressure, mmHg (n = 515)	100 (90–110)	120 (110–120)	120 (110–120)	< 0.001
Low (< 90)	11 (32.4)	8 (2.2)	1 (0.9)	
Normal (90–119)	20 (58.8)	174 (46.8)	36 (33.0)	
Elevated (120–129)	3 (8.8)	179 (48.1)	51 (46.8)	
Hypertension state 1 (130–139)	0 (0.0)	7 (1.9)	12 (11.0)	
Hypertension state 2 (140–179)	0 (0.0)	4 (1.0)	9 (8.3)	
Respiratory rate, per minute (n = 525)	22.0 (20.0–24.0)	19.0 (18.0–22.8)	20.0 (18.0–23.0)	0.014
≤ 24	39 (84.8)	355 (95.4)	99 (92.5)	
≥ 25	7 (15.2)	17 (4.6)	8 (7.5)	
Symptoms				
Fatigue	13 (28.3)	178 (46.8)	59 (51.8)	0.024
Dry cough	18 (39.1)	178 (46.8)	67 (58.8)	0.033
Pharyngalgia	16 (26.1)	120 (31.6)	40 (35.1)	0.531
Headache	3 (6.5)	39 (10.3)	16 (14.0)	0.327
Anorexia	6 (13.0)	70 (18.4)	31 (27.2)	0.058
Dyspnea	2 (4.3)	14 (3.7)	18 (15.8)	< 0.001
Expectoration	0 (0.0)	10 (2.6)	13 (11.4)	< 0.001
Abdominal pain	1 (2.2)	8 (2.1)	4 (3.5)	0.650
Diarrhea	1 (2.2)	6 (1.6)	1 (0.9)	0.704
Nausea	0 (0.0)	5 (1.3)	0 (0.0)	0.740
Vomiting	0 (0.0)	1 (0.3)	0 (0.0)	0.810
Dizziness	1 (2.2)	16 (4.2)	5 (4.4)	0.939
Antiviral Therapy	39 (95.1)	164 (85.9)	77 (84.6)	0.226
Lopinavir	1 (16.7)	2 (3.3)	0 (0.0)	0.206
Interferon	8 (61.5)	1 (1.7)	0 (0.0)	< 0.001
Arpeflu	26 (92.9)	151 (81.2)	68 (79.1)	0.252
Other antiviral drugs	21 (84.0)	119 (75.3)	58 (74.4)	0.599
Antibiotic therapy	37 (100.0)	363 (99.7)	110 (100.0)	0.817
Hydroxychloroquin	16 (94.1)	262 (93.9)	60 (93.8)	0.998
Chloroquine	6 (66.7)	53 (55.2)	20 (50.0)	0.668
Azithromycin	36 (100.0)	346 (99.7)	106 (99.1)	0.499
Other antibiotics	22 (88.0)	257 (92.4)	64 (88.9)	0.512
Immunoglobulin therapy	29 (90.6)	133 (83.1)	47 (77.0)	0.250
Immunoglobulin	1 (16.7)	3 (5.0)	2 (6.9)	0.348
Other drugs	29 (90.6)	133 (83.1)	47 (77.0)	0.250
Glucocorticoid therapy	0 (0.0)	15 (9.9)	6 (15.4)	0.575
Oxygen support	0 (0.0)	4 (2.8)	8 (20.0)	0.002
Oxygen inhalation	0 (0.0)	4 (2.8)	6 (15.4)	0.002
Non-invasive ventilation	0 (0.0)	3 (2.1)	8 (20.0)	0.031
Invasive mechanical ventilation	0 (0.0)	0 (0.0)	5 (13.2)	0.013

Data are number (%) or median (interquartile range). The difference between the total number of participants (1,030) and the total number of respondents by each variable is due to the missing values for the variable.

Demographic and clinical characteristics by ICU admission

Demographic and baseline characteristics of study participants by ICU and non-ICU group are shown in **Table 3**. Sex ($P = 0.001$), age ($P = 0.003$), traveling abroad ($P < 0.001$), asymptomatic case ($P < 0.001$), duration from first symptoms to diagnosis ($P < 0.001$), and temperature ($P = 0.031$) presented significant difference between ICU and non-ICU group. The majority of the ICU group were male (70.3%) and aged 18–49 years (72.0%). About two-thirds (65.1%) of the participants from ICU came from abroad, whereas 42.1% of the non-ICU group came from abroad. The median duration from the first symptoms to diagnosis in the ICU and non-ICU group was 2.0 days (IQR 1.0–2.0) and 2.0 days (IQR 1.0–3.5), respectively. Regarding symptoms, 16.9% of the patients in the ICU group were asymptomatic, while 5.8% in the non-ICU group were asymptomatic. The proportions of temperature below 37.3°C in the ICU group were 85.6%, compared to 81.2% in the non-ICU group.

In the group of patients who were admitted to ICU, the most frequent symptoms were fatigue (73.3%), dry cough (47.3%), pharyngalgia (27.3%), dyspnea (19.3%), headache (17.3%) and expectoration (12.0%). The majority in this group received antiviral therapy (96.2%), antibiotic therapy (99.3%), and immunoglobulin therapy (45.7%). Similar to the group aged 50–84 years, glucocorticoid therapy (13.8%) and oxygen support (17.7%) were used for patients admitted to ICU.

DISCUSSION

This study analyzed symptoms and clinical characteristics of confirmed COVID-19 patients admitted to COVID-19 hospitals in Uzbekistan. Therefore, this study is of considerable significance in that it analyzed the clinical characteristics by using representative data on a national scale in Uzbekistan.

In terms of the number of COVID-19 cases, 588 (57.6%) were male and 432 (42.4%) were female in this study. Many studies report that males are more vulnerable to COVID-19 than females. According to the United Nations Women, the portion of male (54.3%) was slightly higher than that of female (45.7%).[18] According to a retrospective study by Alsofayan et al.[19] in Saudi Arabia, 54.3% of the patients were male, and 45.7% were female. Argenziano et al.[20] also reported more male patients (59.6%) than females (40.4%). As a result of analyzing 7,755 confirmed cases of COVID-19 in Korea, there were more female (62.0%) than male (38.0%).[21]

The mean age of COVID-19 cases in Uzbekistan was 37.0, while the median was 36 (IQR 26–47). Regarding the age group, 70.4% of the patients were aged 18–49 years, 21.1% were over 50 years, and 8.5% were under 17 years. In a study by Kim et al.,[22] the average age of the participants was 42.6 years. The median age of the COVID-19 cases in a study by Huang et al.[14] was 49 (IQR 41–58), indicating outbreaks of confirmed cases in the middle age group. In Korea, 6.2% of the confirmed cases were aged 0–19, 53.3% were aged 20–49, and 40.6% were aged 60 or older. WHO Europe urged for integrated and person-centered systems for long-term care facilities stressing that about half of COVID-19 mortality in European countries were those who live in long-term care facilities.[23] Nuclear and extended family cultures coexist in Uzbekistan, thus it is assumed that the risk of group outbreaks is relatively low among the elderly due to the lack of long-term care facilities.[24]

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Table 3. Characteristics of the study participants by ICU group (n = 843)

Variables	ICU (n = 150)	Non-ICU (n = 693)	*P* value
Sex (n = 834)			0.001
Male	104 (70.3)	376 (54.8)	
Female	44 (29.7)	310 (45.2)	
Age, yr (n = 387)	32.0 (25.0–50.0)	37.0 (27.0–45.0)	0.003
0–17	1 (0.9)	20 (7.1)	
18–49	77 (72.0)	217 (77.5)	
50–84	29 (27.1)	43 (15.4)	
Traveling abroad (n = 819)			< 0.001
No	51 (34.9)	390 (57.9)	
Yes	95 (65.1)	283 (42.1)	
Duration from first symptoms to diagnosis, day (n = 799)	2.0 (1.0–2.0)	2.0 (1.0–3.5)	< 0.001
Asymptomatic case (n = 799)			< 0.001
Asymptomatic	24 (16.9)	38 (5.8)	
Symptomatic	118 (83.1)	619 (94.2)	
Temperature, ˚C (n = 795)	36.6 (36.6–36.8)	36.7 (36.6–36.9)	0.031
< 37.3	113 (85.6)	538 (81.2)	
37.3–38.0	11 (8.3)	105 (15.8)	
≥ 38.1	8 (6.1)	20 (3.0)	
Systolic pressure, mm Hg (n = 795)	120 (110–120)	110 (110–120)	0.096
Low (< 90)	4 (3.0)	22 (3.3)	
Normal (90–119)	60 (44.4)	331 (50.2)	
Elevated (120–129)	60 (44.4)	271 (41.1)	
Hypertension state 1 (130–139)	10 (7.5)	18 (2.7)	
Hypertension state 2 (140–179)	1 (0.7)	17 (2.6)	
Hypertensive crisis (≥ 180)	0 (0.0)	1 (0.1)	
Respiratory rate, per minute (n = 787)	18.5 (18.0–20.0)	20.0 (18.0–22.0)	0.363
≤ 24	110 (93.2)	637 (95.2)	
≥ 25	8 (6.8)	32 (4.8)	
Symptoms			
Fatigue	110 (73.3)	415 (59.9)	0.002
Dry cough	71 (47.3)	410 (59.2)	0.008
Pharyngalgia	41 (27.3)	225 (32.5)	0.220
Headache	26 (17.3)	135 (19.5)	0.544
Anorexia	9 (6.0)	117 (16.9)	0.001
Dyspnea	29 (19.3)	58 (8.4)	< 0.001
Expectoration	18 (12.0)	51 (7.4)	0.060
Abdominal pain	6 (4.0)	52 (7.5)	0.124
Diarrhea	3 (2.0)	51 (7.4)	0.015
Nausea	1 (0.7)	47 (6.8)	0.003
Vomiting	1 (0.7)	39 (5.6)	0.010
Dizziness	3 (2.0)	23 (3.3)	0.602
Antiviral therapy	75 (96.2)	413 (90.8)	0.114
Lopinavir	0 (0.0)	3 (1.2)	0.607
Interferon	1 (4.3)	4 (1.6)	0.356
Arpeflu	67 (88.2)	377 (85.1)	0.484
Other antiviral drugs	24 (63.2)	352 (58.9)	< 0.001
Antibiotic therapy	144 (99.3)	675 (99.0)	0.707
Hydroxychloroquine	112 (94.9)	448 (81.0)	< 0.001
Chloroquine	11 (32.4)	80 (23.4)	0.245
Azithromycin	138 (97.9)	631 (93.5)	0.042
Other antibiotics	86 (85.1)	382 (75.3)	0.033
Immunoglobulin therapy	16 (45.7)	265 (64.0)	0.032
Immunoglobulin	0 (0.0)	9 (3.6)	0.379
Other drugs	16 (45.7)	265 (64.0)	0.032
Glucocorticoid therapy	13 (13.8)	13 (3.7)	< 0.001
Oxygen support	17 (17.7)	10 (2.9)	< 0.001
Oxygen inhalation	17 (17.7)	9 (2.6)	< 0.001
Non-invasive ventilation	8 (9.0)	3 (0.9)	< 0.001
Invasive mechanical ventilation	3 (3.5)	1 (0.3)	0.027

Data are number (%) or median (interquartile range).
The difference between the total number of participants (1,030) and the total number of respondents by each variable is due to the missing values for the variable.

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In Uzbekistan, the median duration from symptom onset to diagnosis was 2 (IQR 1–3) days. In terms of the infection route, 42.3% of the confirmed cases came from abroad, indicating that a large number of confirmed cases from abroad caused a sharp increase in the early stages of the outbreak in Uzbekistan.

The eastern region, which includes Tashkent and Namangan, had the largest number of confirmed cases, accounting for more than half. Tashkent and Namangan have international airports, thus it is considered that people returning from foreign countries would be one of the routes for spreading the disease in the country. The decision to close their borders to stop the spread of COVID-19 by many countries has been controversial.[25] Gomes et al.[25] and Poletto et al.[26] reported that airline traffic reduction and travel restrictions delay the spread of infectious diseases. However, Gostin et al.[27] pointed out that strict travel restrictions are not scientifically effective in preventing the spread and would lead to undermine IHR in the long term. Nevertheless, although the aggressive quarantine policy in Uzbekistan was not able to completely block the spread of COVID-19 in the early stage, and it was successful in delaying the proliferation and preventing the overloading of the medical system in a short period. Thus, implementing social distancing was suitable for preventing local outbreaks in the country. According to the combination of COVID-19 data in Kazakhstan and susceptible-exposed-infected-removed modeling, Semenova et al.[10] showed the importance of social distancing by reporting that adherence to quarantine measures could decrease confirmed cases of COVID-19.

In Uzbekistan, 91.1% of COVID-19 cases were symptomatic. In a retrospective study of COVID-19 cases in Saudi Arabia, 90.7% of the cases were also symptomatic.[19]

As a result of measuring the temperature of COVID-19 cases on admission in this study, 83.3% of the participants were within the normal range (< 37.3°C). In this study, antipsychotic drugs were not used for patients with body temperature above 37°C, but if the temperature rose up to 38°C, it was recommended to take drugs containing paracetamol. Zhu et al.[28] reported that the most frequent symptom of 8,697 COVID-19 patients in China was fever (78.4%) through meta-analysis, which differed from the results of this study. According to temporary guidelines for COVID-19 patient management in Uzbekistan, it explains that the elderly and those with weak immune system may not experience fever, and the screening criteria includes travelling abroad within 14 days, close contacts with COVID-19 cases or those who have acute respiratory infection after visiting foreign countries, and one or more symptoms such as fever, cough, dry cough, or difficulty in breathing.[13] Thus, health care providers are recommended to consider asymptomatic characteristics of fever in the screening process. Fever has been reported as an essential clinical symptom of severe cases of COVID-19 in previous studies,[7,19] but the findings of this study suggest that screening issues based on fever may need to be adjusted in consideration of specific conditions and epidemiological characteristics.

In this study, 4.5% of the participants had a respiratory rate of more than 24 per minute. In another study, respiratory rate over 24 breaths per minute was higher than that of our study, and the reason can be inferred that it is related to the low severity and fatality rate of Uzbekistan COVID-19 cases.[14]

In this study, the main symptoms of the group aged 50–84 years were dry cough (58.8%), fatigue (51.8%), dyspnea (35.1%), and pharyngalgia (27.2%), and the main symptoms of the

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group aged 18–49 years were dry cough (46.0%), fatigue (46.0%), pharyngalgia (31.6%), anorexia (18.4%), and headache (15.8%). The main symptoms of participants aged 0–17 years were dry cough (39.1%), fatigue (28.3%), dyspnea (26.1%), pharyngalgia (13.0%), and abdominal pain (10.2%). Nonetheless, there were some differences in subjective symptoms. Zhu et al.[28] reported that the most frequent symptoms of COVID-19 patients in China were fever (78.4%), cough (58.3%), fatigue (34%), myalgia (21.9%), expectoration (23.7%), anorexia (22.9%), chest tightness (22.9%) and dyspnea (20.6%) through meta-analysis. Liu et al.[29] analyzed the risk factors associated with the severity of COVID-19, and the result showed that fatigue (odds ratio [OR], 3.74; $P = 0.054$) was associated with severe cases. Among the COVID-19 cases in this study, 8.5% of the patients were aged under 18 years. According to a survey of the clinical and epidemiological characteristics of 36 children with COVID-19 in China, COVID-19 affected several vital organs with some amounts of myocardial enzymes, and a large number of asymptomatic cases in the pediatric group had the risk of community transmission.[7] In the US, the Centers for Disease Control and Prevention (CDC) reported that relatively few children under the age of 18 with COVID-19 were hospitalized, and showed fewer symptoms of fever, cough, or difficulty breathing than adults aged 18 to 64.[30]

While most patients received antiviral and antibiotic therapy, and these findings were similar with a previous study,[8] oxygen support of this study was relatively low compared to a study conducted in Hubei Province, China.[15] The low severity might be explained in that patients were detected in the early stages and all confirmed patients were referred to the hospitals regardless of symptoms.

Among the different age groups of patients with COVID-19 in Uzbekistan, there were more female patients in group aged 0 to 17 years and more male patients in the rest of the groups. According to a researcher who participated in this study, it might be explained that parents of girls suspected of COVID-19 took them to the hospital immediately for fear of more complications than boys, and it led to prompt COVID-19 testing. With regard to traveling abroad, about half of the group aged 18–49 years reported that they came from abroad. This finding was similar with a study regarding initial characteristics of imported COVID-19 cases in Korea, given that the main age groups were 20–29, 30–39, 40–49.[31]

As a result of comparing the temperature of each age group, the differences were not statistically significant. Though adults with COVID-19 showed a higher frequency of fever than children according to a clinician guide by Government of Canada,[32] circumstances in Uzbekistan were different. We can infer that the proportion of the elderly with high fever was relatively low, as temporary guidelines for COVID-19 management in Uzbekistan says that the elderly may not experience high temperature.[13] A study that analyzed the risk factors for elderly patients in Korea also found that the difference between surviving patients and deceased patients was not statistically significant.[33] Normal blood pressure (90–119 mmHg) were statistically different between the groups.

The blood pressure presented in this study is the result measured on admission, rather than underlying diseases such as the high blood pressure of the patients. According to a survey of patients over 65 years old in Korea, the mean blood pressure of surviving and deceased patients was 138.1 mmHg and 114.0 mmHg, respectively, and the difference between the groups was statistically significant.[33]

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Although underlying diseases were not included in this study, Liu et al.[29] reported that disease severity and hypertension were highly associated (OR, 3.59; $P = 0.048$). However, a study by Lee et al.[33] reported that blood pressure was not statistically significant as a risk factor for underlying diseases in patients over 65 years old.

The respiratory rate between three age groups in this study was statistically significant. Compared to older groups, patients aged 0 to 17 years had a higher portion of more than 24 respiratory rate per minute. In can be inferred that the infant and toddler's normal respiratory rate is higher than that of adults, and it led to the highest percentage of respiratory rate over 24 in the youngest group.[34,35]

Symptoms showed statistical differences between age groups were fatigue, dry cough, anorexia, dyspnea, and expectoration, and the symptoms were most frequent in the oldest group. According to a study on different influence of COVID-19 by age, children with COVID-19 showed asymptomatic or mild symptoms compared to adults.[36]

Regarding the therapies and treatment, only oxygen support showed significant differences. While no patients in group aged 0–17 years received oxygen support, one-fifth of patients in group 50–84 received the support. This result is similar to a study of 3,060 COVID-19 patients, in which patients under the age of 50 were able to recover without oxygen support.[37]

Comparing ICU and non-ICU patients, more male patients (70.3%) were admitted to ICU than female (29.7%), which was consistent with a clinical study conducted in Wuhan, China.[14] The portion of patients aged 50–84 years of ICU group was higher than that of those who were not admitted to ICU. In a comparative COVID-19 study of clinical characteristics by severity, 69.1% of patients aged more or 65 showed high severity scores ranging from 5 to 8.[37] Compared to non-ICU group, patients in ICU group had more international travel histories. According to GISAID, COVID-19 are classified as S, L, V, G, GH and GR clades by nucleic acid sequence,[38] Korea Centers for Disease Control and Prevention (KCDC) announced that clades can be varied according to assumed country of origin.[39] KCDC analyzed virus classification and found epidemiological information with specific clade: S clade were identified from imported cases during early period and GR were found from crews in Russian ship arrived at Busan port or passengers of international arrivals.[40] Analysis of the nucleic acid sequence in Uzbekistan does not exist as far as we know, thus further study needs to be conducted to analyze relationships between epidemiological information and virus classification.

While duration from the first symptoms to diagnosis was significantly different between two groups in this study, a study regarding 3,060 patients with COVID-19 in Korea showed that there was no statistically significant differences between COVID-19 severity scores.[37] There were more asymptomatic patients in ICU group than non-ICU group. In a study related to asymptomatic infections with COVID-19 in China, asymptomatic transmission within family members showed severe pneumonia.[41]

Body temperature between ICU and non-ICU group were significantly different. In this study, there were more ICU cases with high temperature over 38.1°C, compared to non-ICU cases. Similarly, a study analyzing the characteristics of patients in a university hospital in Daegu, Korea showed the differences of temperature between severe and non-severe group, and high body temperature was found to affect the severity of hospitalized COVID-19 patients.[8]

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In this study, the median blood pressure of the ICU group was higher than that of the non-ICU group, which was similar to a survey by Huang et al.[14] However, there was no statistically significant difference in blood pressure between the groups in this study. According to a study of inpatients in a university hospital in Daegu, Korea, the mean blood pressures of severe and non-severe group was 134.9 and 126.3 mmHg, respectively, but there was no statistical significance.[8] In a study by Huang et al.,[14] there were statistically significant differences between the blood pressure and respiratory rate per minute between the ICU and non-ICU groups.[22]

The respiratory rate between the ICU and non-ICU group in this study was not statistically significant, but the statistical differences between the two groups were significant in the studies on patients in Hubei Province, China, and patients in a university hospital in Daegu, Korea.[8,15] According to a study comparing the clinical characteristics between a severe and conventional group by Tian et al.,[42] the difference between the mean temperature and respiratory rate of the two groups was not statistically significant.

Different symptoms in between the ICU and non-ICU group were fatigue, dry cough, anorexia, dyspnea, diarrhea, nausea and vomiting. In a study to compare clinical characteristics between deceased and survived patients with COVID-19, symptoms that exhibited significant differences between the two groups were sputum, dyspnea, febrile sensation and diarrhea.[43] ICU group received less immunoglobulin therapy, more glucocorticoid therapy and oxygen support than non-ICU group. Antiviral therapy, antibiotics, pegylated interferon-α, oxygen supplement were used more for deceased patients than survivors of COVID-19 in a study analyzing COVID-19 patients hospitalized at nationally-designated treatment hospitals in Korea.[43]

This study has limitations in data analysis due to missing values in age and clinical information about study participants. The clinical symptoms were measured on admission to specialized hospitals after confirmation of COVID-19. Thus, this study lacks an in-depth analysis of the progression of COVID-19 patients. Nevertheless, as this study has investigated patients in hospitals specialized in infectious diseases across Uzbekistan, the contents can be used as objective evidence to implement policies related to COVID-19 in Uzbekistan.

In conclusion, demographic and clinical characteristics were different according to age and ICU group in this study. The oldest group showed more symptoms than the youngest one, and the proportion of asymptomatic cases and visiting abroad in ICU group were more than those of in non-ICU group. Thus, the medical delivery system and resource distribution need to be implemented based on clinical characteristics by age and severity so that it can respond effectively to COVID-19 and delay the spread. Moreover, early detection to find asymptomatic cases of those who returned from abroad need to be set up at the beginning of the pandemic.

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