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Original article

The frequency of occurrence of primary confirmed and probable cases of COVID-19 (on the example of Astana city)

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Abstract

The first case of COVID-19 infection in Kazakhstan was registered on March 13, 2020. At the beginning the detection methods and the load of the spread of the emerging respiratory pathogen were uncertain.

This study aimed to assess the incidence of the secondary attack rate among close contacts of confirmed and probable COVID-19 cases living in the same household in Astana, Kazakhstan.

Methods. The prospective study included 172 participants: 122 confirmed and 50 uncertain cases of COVID-19 with varying degrees of severity as well as their close contacts identified in Astana, Kazakhstan from November 26th, 2020 until February 15th, 2021. All participants were tested with PCR and ELISA assays at the time of inclusion and on days 14-21 of follow-up.

Results. The most common symptoms among both cohorts of patients were fever (90%) (p=<0.001), cough (78.0%) (p=0.11), difficulty breathing (63.3%) (p=<0.001), chills (60%) (p=<0.001). The effective reproductive Rt number for confirmed cases was 1.43 [95%CI=1.27-1.59], for probable cases 0.96 [95%CI=0.70-1.22].

Conclusion. The infection rates following close contact with COVID-19 confirmed and probable cases were 92% and 98.1%, respectively.

Keywords: COVID-19, confirmed case, probable case, close contacts, epidemiology.

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Introduction

Coronavirus infection (COVID-19), whose causative agent is SARS-CoV-2 (severe acute respiratory syndrome-related coronavirus 2), caused new cases of respiratory illness in Wuhan Province in China in December 2019 and subsequently evolved into a pandemic [1].

As of April 15, 2022, there were about 500.18 million confirmed infections worldwide, resulting in 6.19 million deaths [2].

In Kazakhstan, the first case of COVID-19 infection was registered on March 13, 2020. A week later, a state of emergency was declared in the country, which lasted until mid-May 2020. The introduction of quarantine measures and strict self-exclusion of citizens stabilized the epidemiological situation in the country in June 2020. However, the rapid lifting of restrictive measures led to a sharp increase in the incidence of the disease in July 2020. Because of this, the government of the Republic of Kazakhstan was forced to apply new restrictions. By October 2020, the situation in the country was relatively stable, but the number of infected people continued to increase. The first wave of COVID-19 was recorded in April 2021, when Kazakhstan had slipped to 56th place in the world with more than 258.000 cases and 3,156 deaths. As of June 2022, Kazakhstan has had 1.305.355 confirmed cases, 88.815 probable PCR-negative cases, and 13,660 deaths from coronavirus infection [3]. Nevertheless, the incidence of coronavirus remains high in large cities in Kazakhstan, such as Astana and Almaty.

At the beginning of the pandemic, the key epidemiological and clinical characteristics, detection methods and the load of the spread of the emerging respiratory pathogen were uncertain. The record of the clinical and epidemiological characteristics of the first patient were helpful to understand COVID-19 and the spread of the disease in countries.

The symptoms collected from patients were similar to those of influenza. The assessment of epidemiological characteristics consisted of determining the month of illness onset and its relationship to previous travel to other countries, as well as the diagnosis of disease after hospitalization [4].

Then the base and effective reproductive numbers were calculated to characterize the virus.

Studies to collect information about the main clinical and epidemiological characteristics of the Sars-Cov-2 were conducted in different countries but not in Kazakhstan. The aim of this study was to examine the main virial characteristics in Kazakhstani population as well as the secondary attack rate among close contacts of confirmed and probable COVID-19 cases living in the same household.

The results of the study would play a major role in decision-making and policy measures as at the national and at international levels. The experience of Kazakhstan will provide scientists with an overall picture of the spread of the virus in Kazakhstan as a country of the Central Asia. This would help to compare different countries and continents to undertake further actions to combat the virus in the case of new waves of COVID-19.

This study aimed to assess the incidence of the secondary attack rate among close contacts of confirmed and probable COVID-19 cases living in the same household in Astana, Kazakhstan.

Methods

Study population. This study was a prospective study that included 122 patients with COVID-19 confirmed by PCR with varying degrees of severity and who were on outpatient treatment, and 50 patients who were hospitalized with signs of COVID-19 pneumonia but with a negative PCR result in Astana, the capital of Kazakhstan (Figure 1). Further, close contacts of confirmed and probable cases were also included in the study. A follow-up of cases and their close contacts was conducted from November 26, 2020 to February 15, 2021.

All primary cases were selected from the database of confirmed cases of the Ministry of Health of the Republic of Kazakhstan; data on close contacts were reported by the cases themselves.

Inclusion criteria: patients' own wishes and signing of informed consent to participate in the study. There were no restrictions by age.

Exclusion criteria: refusal of patients or their caregivers to participate in the study or death of the participants.

At baseline clinical and epidemiological data were collected by interview at the time of hospitalization or during the home visit. For those who were in self-isolation the interview was conducted by telephone. Self-reported age, gender, nationality, occupation, the number of family members living in the same house together with the case, date of the contact with potential case, comorbidities, symptoms and date of their occurrence, travels were collected by the questionnaire. Questionnaire forms used in the study were specially developed by the World Health Organization for COVID-19 cases and their close contacts.

In addition, blood was drawn from cases and close contacts to verify the potential presence of COVID-19 by ELISA on days 1 through 7 after a positive PCR result and after inclusion in the study, as well as on days 14-21 of follow-up. Total antibody count of IgM and IgG antibodies to COVID-19 were determined by ELISA test. At the same time ELISA was not the basis for the categorization of the participants as it was PCR test. ELISA test was performed only to confirm the diagnosis of COVID-19.

Computed tomography was undertaken for hospitalized patients with COVID-19 pneumonia.

Variables of interest / Outcomes. Confirmed case - a person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms.

Probable case - a patient who meets clinical criteria of COVID-19 and epidemiologically linked to a of case, has a typical chest imaging findings suggestive of COVID-19 but the PCR is negative.

Primary case (or index case) - an individual who tests positive for 2019-nCoV and has the earliest onset date in a particular setting for household. Cases with onset dates less than 24 hours from the onset date of

the primary case are considered to be "co-primary" cases.

Secondary case - a contact who becomes a case with positive test result 24 hours or more after the latest positive test date of the primary and/or co-primary case; or with onset of symptoms 24 hours or more after the latest onset date of the primary and/or co-primary case.

Close contact – a person who lives in the same household with a COVID-19 case or a probable COVID-19 PCR-negative COVID-19 case.

Statistical analysis. The variables were summarized as mean with standard deviation and frequency as a percentage.

Chi-square test was used to analyze the data.

Data were entered using Microsoft Excel and analyzed by the R program. A demo version of SPSS 17.0 and MedCalc Portable was also used to analyze the data.

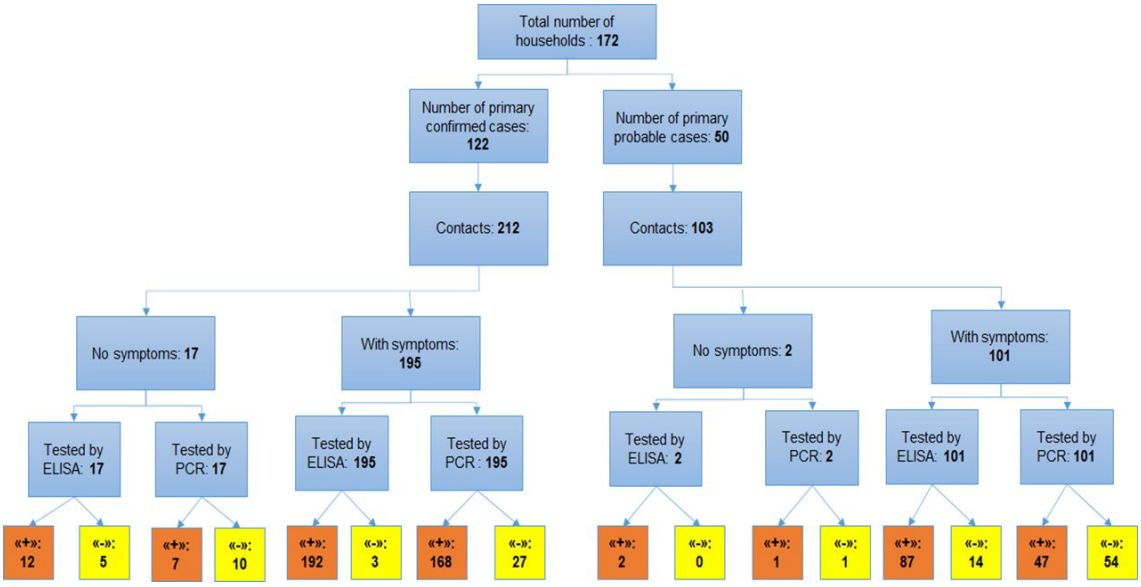

Figure 1 - Flow chart of cases of COVID-19 and household contacts
Note: PCR - polymerase chain reaction test for COVID-19 is a molecular test that analyzes your upper respiratory specimen, looking for genetic material (ribonucleic acid or RNA) of SARS-CoV-2, the virus that causes COVID-19. ELISA - enzyme-linked immunosorbent assay also referred to as the serology test. The antibody test can assist with precision diagnoses as well as characterization of the spread and prevalence of the disease.

Results

172 COVID-19 cases were included in this study, of them 122 were confirmed cases and 50 were probable cases. The mean age of the total sample was 49.0 years (SD 17.3), the mean age of confirmed cases was 46.5 (SD 15.6), and probable cases was 55.3 (SD 19.7). The min-max age range was between 0 and 90 years.

The mean age of contacts of confirmed cases was 34.5 (SD 17.4), and contacts of probable cases was 44.8 (SD 19.2).

Among primary confirmed cases there were 60 males (49.2%), and 62 females (52.8%). Among primary probable cases the number of males and females was equal to 25 (50%). Among COVID-19-positive contacts there were 93 males (43.9%), and 119 females (56.1%). Among probable cases the number of males was 38 (36.9%), females were 65 (63.1%).

The main demographic and clinical characteristics are presented in Table 1.

Table 1 - Demographics, baseline characteristics, and clinical outcomes of 172 patients with COVID-19

	Patients (n=172)
Age, years	
Mean (SD)	49,01
Range	2-89
≤39	56 (33%)
40-49	29 (17%)
50-59	29 (17%)
60-69	42 (24%)
≥70	16 (9%)
Sex	
Female	87 (51%)
Men	85 (49%)

Table 1(Continuation) - Demographics, baseline characteristics, and clinical outcomes of 172 patients with COVID-19

	Patients (n=172)
Occupation	
Self-employed	8 (5%)
Employee	80 (47%)
Unemployed	22 (13%)
Retired	52 (30%)
Student	6 (3%)
Child	4 (2%)
Chronic medical illness	
Cardiovascular diseases	30 (17%)
Malignant tumor	2 (1%)
Respiratory system diseases	5 (3%)
Obesity	39 (23%)
Diabetes	8 (5%)
Chronic renal diseases	5 (3%)
Nervous system diseases	1 (0.6%)
Hospitalized	118 (67%)
Admission to intense care unit	1 (0.6%)
Clinical outcome	
Remained in hospital	56 (33%)
Discharged	62 (36%)
Died	1 (0.6%)

The average number of household members was 2.83 (0.96), 2.74 for primary confirmed and 3.06 for primary probable cases (1.03 and 0.74, respectively). The mean number of contacts per case was 1.83 (0.96), for confirmed PCR positive cases - 1.74 (1.03) contacts and for probable PCR negative cases - 2.06 (0.74) contacts (Table 2).

Table 2 - Number of households with PCR + and PCR - results

Total number of patients	172
PCR positive	122
PCR negative	50
Average size of households	2,83
PCR positive	2,74
PCR negative	3,06
Average size of contacts per one patient	1,83
PCR positive	1,74
PCR negative	2,06

Clinical Characteristics. The most common symptoms among the patients included in the study were cough 70%, loss of appetite 63%, fever 63%, loss of smell 56%, and fatigue 56%. The least common symptoms were vomiting 2%, diarrhea 7% and nausea 8%.

Among 50 hospital cases, 44 cases (26%) had manifest COVID-19-associated pneumonia according to computed tomography assessment.

On days 14-21 of follow-up, patients noted the occurrence of the following symptoms of the disease: the most common were fatigue 92%, headache 62%, persistent cough 45%, and fever 43% (Table 3).

In probable cases at the beginning of the follow-up period, the most common symptoms similar to confirmed cases were fever 90% (p=<0.001), cough 78.0% (p=0.11), difficulty breathing 63.3% (p=<0.001), chills 60% (p=<0.001) and loss of appetite 94%, loss of smell 90% and taste 64%.

The most frequent symptoms among contacts of confirmed and probable cases within 7 days of follow-up were headache 57.1% and 89.3% (p=<0.001), fatigue 55.2% and 90.3% (p=<0.001), loss of smell 47.6% and 60.2% (p=0.02) and muscle pain 36.3% and 92.2% (p=<0.001).

Table 3 - Clinical characteristics of 172 patients with COVID-19 at admission and during 14-21 days of supervision

	PCR-positive cases, N=122	PCR-negative cases, N=50	p-value
At admission			
Fever (≥38°C)	63 (51.6%)	45 (90.0%)	<0.001
Sore throat	43 (35.5%)	22 (44.0%)	.18
Cough	82 (67.8%)	39 (78.0%)	.11
Rhinorrhea	38 (32.5%)	0 (0.0%)	<0.001
Shortness of breath	22 (20.0%)	31 (63.3%)	<0.001
Chills	38 (31.1%)	30 (60.0%)	<0.001
Vomiting	4 (3.3%)	0 (0.0%)	.23
Nausea	13 (10.7%)	0 (0.0%)	0.02
Diarrhea	12 (9.8%)	0 (0.0%)	0.02
Headache	73 (59.8%)	6 (12.0%)	<0.001
Rash	1 (0.8%)	0 (0.0%)	.32
Muscle ache	41 (33.6%))	3 (6.0%)	<0.001
Joint ache	29 (23.8%)	0 (0.0%)	<0.001
Loss of appetite	61 (50.0%)	47 (94.0%)	<0.001
Nasal bleeding	2 (1.6%)	0 (0.0%)	.44
Fatigue	90 (73.8%)	6 (12.0%)	<0.001
Loss of smell	52 (43.0%)	45 (90.0%)	<0.001
Loss of taste	47 (38.8%)	32 (64.0%)	0.002
Altered state of consciousness	1 (0.8%)	0 (0.0%)	.32
Other neurological signs	1 (0.8%)	0 (0.0%)	.32
14-21 days			
Fever (≥38°C)	54 (44.3%)	20(40.0%)	.36
Sore throat	17 (14.3%)	14(28.0%)	0.02
Cough	57 (47.5%)	21 (42.0%)	.34
Rhinorrhea	14 (11.7%)	15 (30.0%)	0.003
Shortness of breath	29 (24.2%)	16(32.0%)	.17
Chills	53 (44.2%)	20 (40.0%)	.40
Vomiting	3 (2.5%)	0 (0.0%)	.31
Nausea	8 (6.7%)	0 (0.0%)	0.07
Diarrhea	7 (5.8%)	0 (0.0%)	0.09
Headache	61 (50.8%)	45 (90.0%)	<0.001
Rash	1 (0.8%)	0 (0.0%)	.32
Conjunctivitis	1 (0.8%)	0 (0.0%)	.32
Muscle ache	36 (30.3%)	6 (12.0%)	0.01
Joint ache	19 (16.0%)	1 (2.0%)	0.01
Loss of appetite	48 (40.3%)	20 (40.0%)	.46
Fatigue	108 (90.0%)	50 (100.0%)	0.01
Cramping	2 (1.7%)	0 (0.0%)	.44
Loss of smell	24 (20.0%)	0 (0.0%)	<0.001
Loss of taste	16 (13.3%)	0 (0.0%)	0.008
Other neurological signs	2 (1.7%)	0 (0.0%)	.44

On days 14-21 of follow-up, headache 60.6% and 9.7% (p=<0.001), and fatigue 87% and 100% (p=<0.001) respectively, persisted in the close contacts of confirmed and probable cases (Table 4).

The percentage of contacts of confirmed cases with symptoms of the disease was 92% (195), 88.1% (177) of contacts showed symptoms between 0 and 11 days after contact with the cases. In general, 2.5% (3 households) had no symptoms. The percentage of households with asymptomatic primary contacts (i.e., contacts that developed symptoms earlier than cases or after 12 days or more) and who presented positive PCR or ELISA results was 7.4% (9 households).

Table 4 - Clinical characteristics of contacts of PCR-positive and PCR-negative cases on 0-7 days and on 14-21 days of supervision

	Contacts of PCR-positive cases, N=212	Contacts of PCR- negative cases, N=103	p-value
0-7 days			
Fever (≥38°C)	54 (25.5%)	75 (72.8%)	<0.001
Sore throat	54 (25.5%)	61 (59.2%)	<0.001
Cough	56 (26.4%)	59 (57.3%)	<0.001
Rhinorrhea	100 (47.4%)	72 (69.9%)	<0.001
Shortness of breath	8 (3.8%)	62 (60.2%)	<0.001
Chills	93 (43.9%)	54 (52.4%)	0.09
Vomiting	3 (1.4%)	0 (0.0%)	.27
Nausea	9 (4.2%)	0 (0.0%)	0.03
Diarrhea	11 (5.2%)	0 (0.0%)	0.02
Headache	121 (57.1%)	92 (89.3%)	<0.001
Muscle ache	77 (36.3%)	95 (92.2%)	<0.001
Joint ache	54 (25.5%)	3 (2.9%)	<0.001
Loss of appetite	43 (20.3%)	1 (1.0%)	<0.001
Loss of smell	101 (47.6%)	62 (60.2%)	0.02
Loss of taste	53 (25.0%)	53 (51.5%)	<0.001
Fatigue	117 (55.2%)	93 (90.3%)	<0.001
14-21 days			
Fever (≥38°C)	12 (5.8%)	0 (0.0%)	0.01
Sore throat	19 (9.1%)	0 (0.0%)	0.001
Cough	13 (6.3%)	1 (1.0%)	0.04
Rhinorrhea	28 (13.5%)	0 (0.0%)	<0.001
Shortness of breath	3 (1.4%)	1 (1.0%)	.42
Chills	15 (7.2%)	1 (1.0%)	0.02
Nausea	2 (1.0%)	0 (0.0%)	.40
Diarrhea	3 (1.4%)	0 (0.0%)	.42
Headache	126 (60.6%)	10 (9.7%)	<0.001
Conjunctivitis	1 (0.5%)	0 (0.0%)	.35
Muscle ache	11 (5.3%)	0 (0.0%)	0.02
Joint ache	5 (2.4%)	1 (1.0%)	.34
Loss of appetite	17 (8.2%)	0 (0.0%)	0.004
Loss of smell	25 (12.0%)	0 (0.0%)	<0.001
Loss of taste	10 (4.8%)	0 (0.0%)	<0.001
Fatigue	181 (87.0%)	103 (100.0%)	<0.001

Among contacts of probable cases, 98.1% (101) showed some form of coronavirus infection symptoms, and 87.3% (89) developed symptoms between 0 and 11 days after contact with a symptomatic case (Table 5. All households of probable cases had at least one contact with symptoms and only 12% (6) households had no symptomatic primary contacts at the follow-up visit. Only 3 contacts of primary confirmed cases who had PCR and ELISA had all negative PCR and ELISA results and were asymptomatic. One contact had no positive PCR results and no symptoms, but he refused to do ELISA.

Therefore, among 315 contacts of confirmed and probable cases, 311 people (98.7%) had at least one indicator of COVID-19.

All 4 contacts who did not manifest any sign of COVID-19 belonged to the 4 primary confirmed cases. These 4 households had other family members who had either a positive PCR or a positive ELISA test. This proves that SARS-CoV-2 virus transmission occurred in all households.

Table 5 - Number of contacts of PCR positive and PCR negative cases with and no symptoms

	Contacts of PCR-positive cases, N=212	Contacts of PCR-negative cases, N=103
Number of contacts with symptoms	195 (92%)	101 (98.1%)
Number of contacts presenting symptoms on 0-11 days after contacting the case	177 (88.1%)	89 (87.3%)
Number of households with no symptoms in contacts	3 (2.5%)	0 (0.0%)
Hospitalized contacts	5 (2.4%)	1 (1.0%)

Discussion

The study of the spread of coronavirus infection among close contacts living in the same household provides a unique opportunity to study infection and transmission because there is often a clearer and more fixed exposure to the source of infection [5,6].

The most common symptoms of COVID-19 are fatigue, cough, headache, fever, and loss of appetite [7,11].

Our results show the high infectiousness of the virus within the family. They are consistent with the stochastic transmission model of SARS-CoV-2 where a small proportion of cases are responsible for most of the secondary transmission [12].

It is also worth taking into account potential factors that increase the chances of transmission in the family, such as certain symptoms and severity of the disease in a COVID-19 case [13], as well as physical factors, such as the size of the home and the number of rooms, which can affect the ability of family members to maintain physical distance in the home.

It is also important to note that the number of people living in the same household in our study was small, which influenced the results. Thus, a high secondary attack rate (SAR) in a household but a modest reproductive number suggests that transmission is due to a relatively small number of high-risk contacts. A high SAR in the household also suggests that the risk of intra-household transmission is lower, otherwise the observed Rt would have been greater.

Hence, our study showed that it was extremely difficult to prevent the development of secondary cases among close contacts living in the same space as the source of infection, since the vast majority of contacts had evidence of secondary infection by either PCR or ELISA.

Limitations. Data collection for the study was performed by means of a questionnaire survey of primary confirmed and probable cases and their close contacts, in which physicians of different levels (inpatient and primary care medical organizations) participated. Symptom questionnaires were filled out in person during hospitalization, as well as by telephone interview at the outpatient level, which could have affected the reliability or completeness of the data collected, given the lack of respondents' time to talk, as well as errors due to the need to recall the facts from the past.

In addition, the sensitivity and specificity of laboratory testing by PCR and ELISA methods are not one hundred percent, so sporadic classification errors are possible. However, this did not affect the conclusions of the study.

Moreover, there is a possibility that the link established between primary and secondary cases for some of the secondary cases may be erroneous, since no study of the causative agents (SARS-CoV-2 viruses) to establish similarities and differences between them has been conducted. A secondary case could have been contracted not through contact in the household from a primary case, but at work or in another mass gathering place.

Conclusion

The probable COVID-19 cases received indirect confirmation of an infectious etiology associated with SARS-Cov-2 infection because about half of their close contacts were PCR-test positive and more than 80% had antibodies to the virus in their blood.

The study showed that COVID-19 disease had clinical symptoms for both primary and secondary cases, most of which had COVID-19 symptoms to varying degrees.

Among the confirmed index cases, the most frequent symptoms were fatigue, cough, headache, fever, and loss of appetite.

The secondary attack rate was 98.7%. All close contacts lived in the same space as the cases. Coronavirus infection after contact with a COVID-19 case among contacts of confirmed cases appeared at 92% and 98.1% among probable cases. Manifestation of the disease was confirmed by PCR and ELISA tests. In general, our results indicate a high infectiousness of the COVID-19 among close contacts within the households.

Ethical aspects. Before starting the study, all documents, including the research protocol and data collection questionnaires, underwent expert review and received positive approval from the Local Ethics Commission of the NJSC Astana Medical University, Minutes of Meeting No. 9 of 09.09.2020.

Patients were included in the study only after they received full information about it and gave written voluntary consent to participate.

All information collected concerning the health status of patients is provided with confidentiality in accordance with the Law of the Republic of Kazakhstan dated May 21, 2013 N 94-V "On Personal Data and Their Protection" and Article 28 of the Code of the Republic of Kazakhstan "On Public Health and Health Care System".

Before the study began, the entire research team signed a non-disclosure agreement.

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Conflict of interest: None declared

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Қазақстанда COVID-19 алғашқы расталған және ықтимал жағдайларының кездесу жиілігі (Астана қаласының мысалында)

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Түйіндеме

Кіріспе. Қазақстанда COVID-19 инфекциясының алғашқы жағдайы 2020 жылғы 13 наурызда тіркелді. Бастапқыда пайда болған респираторлық патогенді анықтау әдістері мен таралу дәрежесі белгісіз болды.

Бұл зерттеудің мақсаты Қазақстанның Астана қаласында бір үй шаруашылығында тұратын COVID-19 расталған және ықтимал жағдайларымен жақын байланыстар арасында қайталама ұстамалардың жиілігін бағалау болды.

Әдістері. Проспективті зерттеуге 172 қатысушы енгізілді: 122 расталған және әртүрлі ауырлық дәрежесіндегі 50 белгісіз COVID-19 жағдайы, сондай-ақ олардың 2020 жылғы 26 қарашадан 2021 жылғы 15 ақпанға дейін Астана қаласында (Қазақстан) анықталған жақын байланыстары. Барлық қатысушылар қосу кезінде және бақылаудың 14-21-ші күні ПТР және ИФА талдауларымен сыналды.

Нәтижелері. Пациенттердің екі тобында да жиі кездесетін белгілер қызба (90%) (p=<0,001), жөтел (78,0%) (p=0,11), тыныс алудың қиындауы (63,3%) (p=<0,001), қалтырау (60%) (p=<0,001). Расталған жағдайлар үшін репродуктивті Rt тиімді Саны 1,43 [95% ci=1,27-1,59], ықтимал жағдайлар үшін 0,96 [95% ci=0,70-1,22] болды.

Қорытынды. COVID-19 расталған және ықтимал жағдайларымен тығыз байланыста болғаннан кейін инфекция деңгейі сәйкесінше 92% және 98,1% құрады.

Түйін сөздер: COVID-19, расталған жағдай, ықтимал жағдай, тығыз байланыс, эпидемиология.

Частота встречаемости первичных подтвержденных и вероятных случаев COVID-19 (на примере города Астаны)

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Резюме

Введение. Первый случай заражения COVID-19 в Казахстане был зарегистрирован 13 марта 2020 года. Вначале методы обнаружения и степень распространения возникающего респираторного патогена были неопределенными.

Цель исследования: оценить частоту вторичных приступов среди близких контактов с подтвержденными и вероятными случаями COVID-19, проживающими в одном домохозяйстве в городе Астана, Казахстан.

Методы. В проспективное исследование были включены 172 участника: 122 подтвержденных и 50 неопределенных случаев COVID-19 с различной степенью тяжести, а также их близкие контакты, выявленные в Астане с 26 ноября 2020 года по 15 февраля 2021 года. Все участники были протестированы с помощью ПЦР и ИФА-анализов во время включения и на 14-21-й день наблюдения.

Результаты. Наиболее распространенными симптомами среди обеих групп пациентов были лихорадка (90%) (p=<0,001), кашель (78,0%) (p=0,11), затрудненное дыхание (63,3%) (p=<0,001), озноб (60%) (p=<0,001). Эффективное число репродуктивных Rt для подтвержденных случаев составило 1,43 [95%ДИ=1,27-1,59], для вероятных случаев 0,96 [95% ДИ=0,70-1,22].

Выводы. Показатели инфицирования после тесного контакта с подтвержденными и вероятными случаями COVID-19 составили 92% и 98,1% соответственно.

Ключевые слова: COVID-19, подтвержденный случай, вероятный случай, тесные контакты, эпидемиология.