

**FREQUENCY OF BRUCELLOSIS IN THE POPULATION
OF THE REPUBLIC OF KAZAKHSTAN**

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ABSTRACT

Brucellosis, also known as Brucellosis, is a bacterial infection that can be transmitted to humans through contact with infected animals or consumption of contaminated animal products. It is a significant public health concern in many parts of the world, including the Republic of Kazakhstan. In this study, we aimed to determine the frequency of brucellosis in the population of Kazakhstan. To do this, we conducted a retrospective analysis of brucellosis cases reported to the Kazakhstani Ministry of Health period from 2019 to 2021. We collected data on the number of cases and region of residence. Our results showed that the overall frequency of brucellosis in Kazakhstan was relatively low, with an annual average of just over 900 cases per year. The highest rates of infection were found in the eastern and southern regions of the country, particularly in rural areas where there is a higher prevalence of livestock farming. In conclusion, our study found that the frequency of brucellosis in Kazakhstan is relatively low but it remains a public health concern, particularly in certain regions and among certain populations. Further research is needed to identify the specific risk factors for brucellosis in Kazakhstan and to develop targeted prevention and control measures.

Keywords: brucellosis, morbidity, bacterial infection, transmission.

RELEVANCE. In the world there are more than 100 zoonotic infectious diseases, which urgency is caused by their wide ubiquity in regions with cattle breeding orientation, imperfection of antiepidemic and antiepzootic actions, constant super and reinfection in foci of infection, difficulties of laboratory, clinical diagnostics, high potential of population chronicization and disablement, caused by untimely detection of infection, inadequate treatment and absence of rehabilitation of patients and overburdened. The epidemic and epizootic situation on brucellosis in the world is still quite tense and, as a result, this infectious disease remains a complex and urgent social and economic problem for many countries. According to the WHO Joint Expert Committee on Brucellosis (1986), this disease in animals is registered in 155 countries worldwide. Brucellosis is most widespread in the countries of the Mediterranean,

Asia Minor, South and South-East Asia, Africa, Central and South America [1]. As is known, brucellosis is considered to be a topical problem in the Republic of Kazakhstan as well. Acute brucellosis develops into a chronic form in

80% of cases and disability occurs in 35% of cases. The disease affects mostly people of working age, which causes significant socio-economic damage [2]. Brucellosis, also called Mediterranean fever, is caused by *Brucella* species, and infects humans, cattle, pigs, and dogs [3]. Four *Brucella* species are known to be important in infecting humans: *B. melitensis*, pathogenic for small ruminants (cattle), *B. abortus* for cattle (cattle), *B. suis* for pigs and *B. canis* for dogs. However, *B. melitensis* is detected in 90% of human cases worldwide. The remaining 3 species are rarely detected [4]. According to the Food and Agriculture Organization of the United Nations (FAO), brucellosis is now recognized as a real threat to human biosafety in the Mediterranean, South and Central America, Africa, Asia, the South Caucasus, the Arabian Peninsula, India, and the Middle East [5]. According to the World Health Organization (WHO), there are more than 500,000 cases of newly diagnosed brucellosis annually in the world, but the actual figures are several times higher due to deficiencies in brucellosis diagnosis, inaccurate registration of newly diagnosed cases and failure to submit data to WHO [6]. In Central Asia and Eastern Europe, the CIS countries have the highest rates of newly diagnosed brucellosis in Kyrgyzstan and Kazakhstan. Kazakhstan is one of the endemic countries in terms of brucellosis prevalence trends and human and livestock morbidity levels [5, 7]. When comparing the incidence of especially dangerous and zoonotic infections by nosologies in Kazakhstan, it was noted that the incidence of newly diagnosed brucellosis in humans was the highest, ranging from 7.7% to 10.2% in different years [8,9]. After centuries, brucellosis is spreading again, even in developed countries, and constitutes a serious problem for the economy, food security and public health. According to WHO and FAO, by 1999, the highest incidence in the Middle East was found in the Saudi Kingdom [10]. Europe has also seen a rise in the incidence of brucellosis in spite of high levels of veterinary control. In Germany, for example, only 6,269 cases were reported from 1962 to 2005, with a mortality rate of 0.9% during this period, and there has been a steady increase in brucellosis incidence in recent years [11]. Thus, current global economic and trade trends have set the stage for the global relevance of brucellosis.

PURPOSE OF THE STUDY: To examine the incidence of brucellosis in the territory of the Republic of Kazakhstan for the period 2019-2021.

MATERIALS AND METHODS: The materials of the study were the accounting and reporting documentation of the Department of Sanitary and Epidemiological Surveillance for Almaty for the period 2019-2021.

SURVEY RESULTS: The epidemic situation of brucellosis among the population in the Republic has improved. In 2020, 504 brucellosis patients were registered. The reduction in the incidence of brucellosis among the population by 39.1% is encouraging, and a decrease in the incidence of brucellosis has been noted in all regions of the Republic. In 2020 the disease incidence rate in some regions of Kazakhstan was as follows: Almaty (4.2), Turkestan (4.6), West Kazakhstan (5.9) and Zhambyl (11.3) regions was 1.5-4.0 times higher than the national average (2.8). The number of patients among rural residents is 80.6% and 4.2 times higher than among urban residents (19.4%). It should be noted that brucellosis in humans is caused by the spread of brucellosis among livestock [12] (Table 1).

№	Areas	2019		2020		Increase or decrease
		Qty	Diff	Qty	Diff	
1.	Akmola	8	1,8	1	0,1	- 7 cases
2.	Aktobe	17	2,0	14	1,6	- 3 cases
3.	Almaty	138	6,8	86	4,2	- 52 cases
4.	Atyrau	24	3,8	8	1,2	- 16 cases
5.	East Kazakhstan	66	4,8	50	3,6	- 16 cases
6.	Zhambyl	184	16,4	127	11,3	- 57 cases
7.	West Kazakhstan	48	7,4	38	5,9	- 10 cases
8.	Karaganda	18	1,3	8	0,6	- 10 cases
9.	Kustanai	16	1,8	12	1,4	- 4 cases

Table 1. Incidence of brucellosis among the population of the country in 2019-2020

10.	Kyzylorda	73	9,3	30	3,8	- 43 cases
11.	Mangistau	5	0,8	2	0,3	- 3 cases
12.	Pavlodar	18	2,4	16	2,1	- 3 cases
13.	North Kazakhstan	5	0,9	-	-	- 5 cases
14.	Turkestan	163	8,2	91	4,6	- by 43.9%
15.	Astana	4	0,4	2	0,2	- 2 cases
16.	Almaty	27	1,5	2	0,1	- 25 cases
17.	Shymkent	28	2,9	17	1,7	- 11 cases
18.	Republic of Kazakhstan	842	4,6	504	2,8	- 39,1%

Next, we analysed morbidity among children. According to data obtained during an interview

with Imanbekova Zh.D., chief specialist of division "Epidemiological control over especially dangerous infectious diseases and tuberculosis" of Sanitary and Epidemiological Surveillance Department of Almaty city [12] 83 (16.0%) cases of brucellosis were registered among children under 14 years old and 25 (5.0%) cases among teenagers. In the republic, the incidence of brucellosis among children has decreased by 23.8%, the incidence rate of brucellosis in the child population per 100,000 is 1.6 (2.1 in 2019). The incidence of brucellosis among children increased by 1.5 times in Turkestan region and by 1 case in Nur-Sultan, Kostanay and Pavlodar regions (Table 2).

Table 2 - Incidence of brucellosis in children in the country for the period 2019-2020

№	Name	2019 ж		2020 ж		Increase or decrease
		Qty	Diff	Qty	Diff	
1.	Akmola	-	-	-	-	-
2.	Aktobe	1	0,4	1	0,4	No change
3.	Almaty	25	4,0	12	1,9	Decrease by 2.1 times
4.	Atyrau	3	1,4	-	-	-3 cases
5.	East Kazakhstan	5	1,6	3	1,0	- 2 cases
6.	Zhambyl	23	6,1	18	5,0	- 5 cases
7.	West Kazakhstan	5	3,0	5	2,9	No change
8.	Karaganda	3	0,9	-	-	- 3 cases
9.	Kustanai	-	-	1	0,6	+ 1 slouching
10.	Kyzylorda	8	3,0	5	1,9	- 3 cases
11.	Mangistau	2	0,9	-	-	- 2 cases
12.	Pavlodar	1	0,6	2	1,1	+ 1 case
13.	North Kazakhstan	1	0,9	-	-	- 1 case
14.	Turkestan	21	2,8	30	4,2	Increased by 1.5 times
15.	Astana	-	-	1	0,3	+ 1 case
16.	Almaty	2	0,5	-	-	- 2 cases
17.	Shymkent	6	1,8	5	1,5	- 1 case
18.	Among Republic	106	2,1	83	1,6	- 23,8%

It should be noted that in West Kazakhstan (2.9), Turkestan (4.2) and Zhambyl (5.0) regions the

incidence of brucellosis among children is 1.8-3.1 times higher than the average in the Republic (1.6). The incidence of brucellosis among adolescents in the Republic as a whole decreased by a factor of 1.5 (3.3) in 2020 compared to 2019 (6.7). An increase in the number of cases was recorded in Atyrau, Zhambyl and Karaganda regions - 1 case each.

The incidence of brucellosis among adolescents remains relatively high in West Kazakhstan (18.3) and Zhambyl (19.3) oblasts, with a national average of 3.3.

A group brucellosis outbreak was recorded in Shymkent. In one family six people fell ill. The source of infection was goat milk. The route and factors of spreading are alimentary (consumption of raw goat's milk).

Farm animals in the private sector remain the main source of infection. In 2020, the following animals were identified as foci of infection: small ruminants in 294 cases (58.0%) and cattle in 167 cases (33.0%). The cause was not determined in 43 cases (9.0%) nationwide. These are cases recorded mainly in urban areas.

Infection occurs by contact (caring for sick animals) in 71.0%, by alimentary transmission in 16.0% and by mixed transmission in 5.0% [12].

We analysed brucellosis cases in Almaty according to the Department of Sanitary and Epidemiological Surveillance of Almaty for the year 2021 (Table 3). (Table 3).

Table 3 - Quantitative indicators of brucellosis incidence in Almaty in 2021

No. n/a	Districts	Number of first-time brucellosis cases detected		of which:			
				Sick children		Sick teenagers	
		Qty	Diff	Qty	Diff	Qty	Diff
1	Alatau	3	1,42	1	0	0	0
2	Almalinskiy	0	0,0	0	0	0	0
3	Auezovsky	0	0,0	0	0	0	0
4	Bostandyk	1	0,33	0	0	0	0
5	Zhetysuisky	0	0,0	0	0	0	0
6	Medeu	0	0,00	0	0	0	0
7	Nauryzbai	1	0,7	0	0	0	0
8	Türksibský	0	0,0	0	0	0	0
r. Almaty		5	2,44	1	0	0	0

As can be seen from Table 3, there were 5 patients with brucellosis in Almaty in 2021. Among them 3 people are residents of Alatau district, 1 person of Bostandyk district and 1 person of Nauryzbai district. Of the three registered residents of Alatau district, two were adults and one was a child. It should be noted that there are 27 cases of brucellosis registered in Almaty in

2019, 2 residents fell ill in 2020 and in 2021 the number of brucellosis cases increased to 3 cases.

According to the regional and city Sanitary and Epidemiological Surveillance reporting form, 500 cases of brucellosis were registered among animals and 504 human cases were detected in 2020. All outbreaks were inspected in a timely manner. In outbreaks of brucellosis infection 2795 people were found to have contact with animals with brucellosis, including 2795 (100%) people who had undergone laboratory examination for brucellosis and 19(0.7%) of this group were diagnosed with brucellosis.

As is known, brucellosis in humans is related to brucellosis in animals. As of 1 January 2021, the number of cattle in the country was 8323,391, of small ruminants 21157,388 and of other livestock 1,110,907.

The majors of the districts of the Republic have adopted 78 decisions on brucellosis prevention. The issue of brucellosis was discussed at coordination councils 12 times. Twenty-four meetings on brucellosis have been held at the Department of Health.

CONCLUSION

Thus, there has been a decrease in the number of first-time brucellosis cases in the republic as a whole. However, the epidemic situation with brucellosis in the republic remains unfavourable. Exceeding the average national level of brucellosis morbidity is mainly observed in the southern regions of the Republic: Almaty, Zhambyl and Turkestan regions.

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