

## HYGIENIC ASSESSMENT OF THE PREVALENCE OF PARASITIC INFECTIONS AND ACUTE BACTERIAL INTESTINAL INFECTIONS AMONG RESIDENTS OF THE ARAL SEA REGION

L.K. Ibraeva<sup>1</sup>, Toguzbaeva K.K.<sup>2</sup> Shayahmetov S.Sh.,<sup>3</sup> Nurseitov M.S.<sup>4</sup>  
, Orazumbekova B. K.<sup>5</sup>, Kaldybay D.N.<sup>6</sup>

<sup>1</sup>Research of the National Center of Occupational Diseases, Karaganda, Kazakhstan

<sup>1</sup>Kazakh National Medical University named after S.D. Asfendiyarov, Almaty, Kazakhstan

*Summary:* The article presents the hygienic assessment of the prevalence of parasitic infections and the acute bacterial intestinal infections among residents of Kyzylorda and Karaganda regions. The data of a retrospective analysis of bacterial and parasitic pollution of objects in the Kyzylorda and Karaganda regions for the years 2004-2013 and the results of their own research of contamination of the environment by parasites.

*Key words:* The Aral see, a hygienic assessment, microorganisms, the parasitic infestations, acute bacterial intestinal infections

### ГИГИЕНИЧЕСКАЯ ОЦЕНКА РАСПРОСТРАНЕННОСТИ ПАРАЗИТАРНЫМИ ИНВАЗИЯМИ И ОСТРЫМИ БАКТЕРИАЛЬНЫМИ КИШЕЧНЫМИ ИНФЕКЦИЯМИ СРЕДИ ЖИТЕЛЕЙ ПРИАРАЛЬЯ

Ибраева Л.К.<sup>1</sup>, Тогузбаева К.К.<sup>2</sup>, Шаяхметов С.Ш.<sup>3</sup>, Нурсейтов М.С.<sup>4</sup>,  
Оразумбекова Б.К.<sup>5</sup>, Калдыбай Д.Н.<sup>6</sup>

1. Национальный центр профессиональных заболеваний, РКП, г. Караганда,

2. Казахский Национальный Медицинской Университет им. Асфендиярова С.Д., г. Алматы, Казахстан

*Резюме:* В статье представлена гигиеническая оценка распространенности паразитарными инвазиями и острыми бактериальными кишечными инфекциями среди жителей Кызылординской и Карагандинской областях. Представлены данные ретроспективного анализа бактериального и паразитарного загрязнения объектов среды в Кызылординской и Карагандинской областях за 2004-2013 годы и результаты собственных исследований обсемененности внешней среды паразитами.

*Ключевые слова:* Арал, гигиеническая оценка, микроорганизмы, паразитарные инвазии, острые бактериальные кишечные инфекции

### АРАЛ КӨЛҮНҮН ТУРГУНДАРЫНЫН АРАСЫНДА МИТЕ ООРУЛАРЫНЫН ЖАНА КУРЧ БАКТЕРИЯЛЫК ИЧЕГИ-КАРЫН ООРУЛАРЫНЫН ТАРАЛЫШЫНЫН ГИГИЕНАЛЫК БААЛОСУ

Ибраева Л.К.<sup>1</sup>, Тогузбаева К.К.<sup>2</sup>, Шаяхметов С.Ш.<sup>3</sup>, Нурсейтов М.С.<sup>4</sup>, Оразумбекова Б.К.<sup>5</sup>, Калдыбай Д.Н.<sup>6</sup>

1. Улуттук өндүрүш гигиенасы жана кесиптик оорулар боюнча борбору, Казакстан Республикасынын Саламаттык сактоо министрлиги, Караганда,

2. С.Д. Асфендияров атындагы Казакстандын улуттук медициналык университети, Алматы, Казахстан

*Кыскача маалымат:* Макал мите ооруларынын жана Кызылорда жана Караганда региондордун тургундарынын арасында курч бактериялык ичеги-карын ооруларынын таралышынын гигиеналык баа берилген. жылдар 2004-2013 үчүн Кызылорда жана Караганда аймактарда объектилерди бактериялык жана мите булганышы бир мүнөз талдоонун маалыматтары жана мите айлана-чөйрөнүн булганышы, өз изилдөөнүн натыйжалары.

*Негизги сөздөр:* Арал, гигиеналык баалоо, микроорганизмдердин, мите infestations, курч ичеги-карын ооруларынын бактериялык

*Introduction.* Aral problem, as the largest environmental disaster of the planet, acquired acute character. Especially dangerous is the drinking water contamination by microorganisms that are pathogenic and can cause outbreaks of epidemic diseases among different populations and animals. Microbial, viral, chemical, radioactive and toxic contamination of surface and ground water, the lack of good quality drinking water remains one of the major causes of the disease. Life expectancy in most regions of the Aral Sea region was reduced to 55 years, the incidence of enteritis, typhoid and hepatitis has reached the highest level in the world. 75% of babies are born sick and weakened, with a variety of degenerative lesions

[1,2]. We have revealed significant adverse changes in health status in the Kyzylorda region and zone of ecological trouble the Aral Sea region. The negative impact of the cosmodrome "Baikonur" exacerbates environmental problems of Kyzylorda region associated with the desiccation of the Aral Sea. Severe environmental and social-economic situation in the Aral Sea region gives grounds to consider it a zone of ecological disaster [3,4].

*The aim* of the study was to estimate the prevalence of hygienic parasitic infestations and bacterial infections among the inhabitants of the Aral Sea region.

*The materials and methods:* The material for the study and analysis of sanitary-

bacteriological contamination were data on morbidity parasitic infestations in Kyzylorda region (5 regions) and in the Karaganda region (in 2 parts) for 2004-2013., these departments sanitary examination of areas of contamination of environmental objects (soil and water) biological factors for 2004-2013., as well as data from a study of water and soil samples collected in the territories of the studied areas of ecological disaster. Studies of soil and water samples for the presence of pathogens of parasitic diseases were carried out according to the approved guidelines [5-8]. Statistical analysis was performed using Statistica v.10 software. Testing for normality of the distribution was carried out according to descriptive statistics (kurtosis and asymmetry), the criterion of Shapiro-Wilks and Kolmogorov-Smirnov, by type of bar charts and line sharing option on normal probability plots. For quantitative variables with normal distribution were calculated arithmetic mean, standard deviation, error of the mean and 95% confidence interval. For quantitative data, do not obey the law of normal distribution - the median and quartiles.

All planned studies have been conducted in full accordance with the schedule in 2014.

*The results:* The Results of the analysis of morbidity dynamics of the population of parasitic diseases in the area have revealed a tendency to reduce the incidence of 1.2 times as ringworm, 1.6 times for beef tapeworm infection. The highest incidence rates per 100 thousand. Population recorded by enterobioze, the average long-term rate was 354.4 per 100 thousand population.

The share enterobiosis in the structure of general morbidity of the population of parasitic infestation begins from 83.4% in 2004. to 60.8% in 2013. The share of all other officially registered invasions accounts for about 28%. Incidence rates in children were higher by 1.6 - 3.0 times, except for the Echinococcosis that among the general population to 3.2 times the incidence was higher than children. The incidence of children of all invasions tended to decrease. The most widespread infestation among children appeared enterobiosis (from 340.4 to 2792.8 0/0000). Thus, of the nine recorded in the field of parasitic diseases most

prevalent in the population is enterobiosis (72%), which registers high rates (average of 354.4 0/0000, among children - 916.3 0/0000). Given the high incidence in all areas highly contagious helminthiosis – enterobiosis was indicator for the invasion of the studied areas, therefore we passed it enterobiosis. The highest figures were observed in Zhalagash v. (1343.2 and 357.7). Parasitic diseases, especially enterobiosis, despite the downward trend, remain relevant for the Aral Sea region.

In a retrospective analysis of bacterial and parasitic pollution of objects in the Kyzylorda and Karaganda regions for the years 2004-2013, it was found that only in a few samples showed bacterial contamination, which differ in the level of morbidity. The results of their own research of contamination of the environment by parasites found everywhere, but non-uniform contamination of helminthes areas studied areas. Thus, the highest in the soil contamination was detected in Shieli v.(8%), Aralsk (1.02%). Most water pollution was discovered in worms Zhalagash - 13.4% Aralsk - 9.5%, -5.5% and Zhosaly and Shieli v. -5.2%.. In the field of pollution of open reservoirs worms was 9.3%, which can be the basis of the prevalence and high morbidity in children enterobiosis supported by highly contagious and the ability to rapidly transmitted through contact-household.

The incidence of acute intestinal infection (AII) in the area and contamination of environmental objects of Escherichia infections (typhoid, paratyphoid A, B, C, salmonellosis, shigellosis) in the territory of the Aral Sea region in comparison with the republican indicators presented in Table 1. The incidence of salmonellosis has been below the national, bacillary dysentery and exceeded the republican level in 2 times. The high incidence observed in Ayteke bi v. - 110.8 against the national figure - 38.1.

Group of acute intestinal infections of bacterial etiology remains a priority for the Kyzylorda region, as more than the republican level in more than 2 times. The share of the food pathway with AII was highest among residents of Aral and Kazaly areas and lowest among residents Shieli area, and contact-household transmission path - and in Karmakshy, Shieli

areas.

Table 1 - Incidence of AII per 100 thousand populations

Infections	Typhoid fever	paratyphoid A, B, C	Salmonellosis	dysentery	AII group	AII established	AII non-established
Republic	0,2	0	14,7	38,1	174,8	82,9	54,3
Kyzylorda region	0	0	3,4	55,1	344,7	176,2	113,3
Aral region	0	0	1,4	4,3	68	47,8	15,9
Zhalagash region	0	0	14,9	22,3	99,5	44,8	48
Kazaly region	0	0	2,8	35,5	237,5	119,5	82,5
Aiteke bi	0	0	2,1	110,8	651,1	162	472,7
Karmakshi region	0	0	2,1	77,9	194,8	80,1	80,1
Shieli region	0	0	0	7,9	85,1	59,8	17,3

Analysis of long-term sanitary-bacteriological examination of drinking water and open water in the 2005-2013 years in the districts of Kyzylorda region has revealed that the highest rate of total bacterial count (TBC) has been in the Aral region in samples of water from the Syrdarya River. Hygiene and bacteriological characteristics of the soil in the Kyzylorda region on total bacterial count (TBC) was the lowest in Shieli area.

As a result of its own investigations the largest number of contaminated water samples was Aralsk: E.coli detected in 25%, S.aureus-50% and A. niger - in 12.5% of cases. Fewer contaminated water samples, E.coli and S.aureus organisms found in p.Shieli but here identified microorganisms Proteus and Ps.aeruginosa. Most of the water samples were combined content of microorganisms. A study of soil samples revealed the presence of bacterial contamination in all 5 districts of Kyzylorda region in various combinations of 2 or 3 types of microorganisms. High rate discharge Klebsiella in soil samples studied areas, which ranged from 26.6% in Zhalagash area of up to 40% - in the Aral Sea. The Klebsiella microorganisms prevalent everywhere and they are resistant to the climatic conditions of the bacteria.

*Conclusion:* The objects of the environment (soil, water) Aral region unevenly contaminated with pathogens and helminthes infections of bacterial infections. Analysis showed the

prevalence of morbidity in the study area parasitic infestations, especially enterobiosis, acute intestinal infections, especially among children under 14 years. At the same time, it revealed a general trend to reduce them by area: enterobiosis - from 3.8 to 33.5 times, AII - from 1.2 to 2.3 times. Prevalence enterobiosis proposed as an indicator territories' biorisk.

## LITERATURE

1. World Health Organization. Safe Abortion: Technical and Policy Guidance for Health Systems. - Geneva: WHO, 2012. - 220 p.
2. Dangerous abortions 'on the rise', says WHO - BBC 19.01.2012.
3. Alnazarova A.Ş. The relevance of the impact of harmful factors on the problem of the Aral Sea region environment morbidity // "Newest scientific achievements - 2009": mat. V Intern. Scient. Conf. - Sofia, 2009. - S.39-41.
4. Alnazarova A.Ş. The main demographic indicators of the population of the Aral region // "Scientific Thought of the Information Age - 2010": mat. VI Intern. Scient. Conf. - Poland, 2010. - S.31-34.
5. Esrey S.A., Potash J.B., Roberts L., Shiff C. Effects of improved water supply on ascariasis, diarrhea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma // Bulletin of the World Health Organization. - 1991. - №69. - P.609-621.
6. Romanenko NA, Padchenko IK, Chebyshev NV Sanitary Parasitology. - M., 2000. - 319 p.
7. Rahmanin YA Scientific and methodological basis of the study, assessment and regulation of biological factors in the environmental health // Hygiene and sanitation. - 2010. - №5. - S.4-8.
8. Mindlin Ya Ways to optimize epidemiological surveillance anthroponoses with fecal-oral mechanism of transmission // Epidemiology and Infectious Diseases. - 2012. - №4. - S.16-20.