

INFLUENCE OF HARMFUL ECOLOGICAL FACTORS ON THE POPULATION OF THE REPUBLIC OF KARAKALPAKSTAN

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Abstract. *An analysis of the leading sanitary-ecological factors of the environment affecting the incidence rates among the population of the Republic of Karakalpakstan in 2009-2018 found. The results of identifying socio-economic factors on the health of the population, obtained annually and analyzed in dynamics for at least five years, are an integral part of the socio-hygienic monitoring of the information and analytical basis of a comprehensive health risk management system and ensuring sanitary and epidemiological well-being of the population. It is also necessary to create prerequisites for further special scientific research to establish causal relationships "socio-economic factors - health status of the population" and assess the risk of the influence of these factors. One of the main factors influencing the health of the population is the provision of the population with drinking water. We have studied the dynamics of the chemical pollution of water in open reservoirs by districts and zones of the Republic of Karakalpakstan.*

Key words: *population, socio-economic, environmental, pollution, indicators, mortality*

Introduction

It is known that in recent years, environmental pollution, ecological safety of the population and territories have become one of the most important problems in the world. According to the World Health Organization (WHO), about 24% of the world's population and 23% of deaths are caused by the detrimental effects of preventable ecological factors.

Thus, considering and comparing the indicators of 2010, cancer mortality in Uzbekistan was 34.5, in Karakalpakstan - 43.0 per 100 000 people, therefore the number of cases in the Republic of Karakalpakstan is 24.6% higher than the average for the country. And in 2018, cancer

mortality in Uzbekistan was 41.1, in Karakalpakstan - 51.4 per 100000, which again indicates the relevance (25%) of large cases in Karakalpakstan.

The above regional differences in the primary oncological incidence and the excess of the incidence rate of Karakalpakstan over the indicators of Uzbekistan prompted us to disclose their causes.

Given the uneven distribution of incidence by territory and by time, the territory of the Republic of Karakalpakstan is conditionally divided into 4 zones: The Western zone (Muinak, Kungrad, Kanlykul and Shumanai districts), the Northern zone (Takhtakupyr, Karauzyak, Chimbay, Kegeyli districts), the Central zone (Nukus city, Khodjeyli, Takhiatash and Nukus districts), and also the Southern zone (Amudarya, Beruni, Ellikkala and Turtkul districts) [5], [6], [7].

In order to increase the visibility of the tendencies, the studied 10-year period is divided into 2 five-year periods: 2009-2013 and 2014-2018.

When studying the dynamics of the incidence of malignant neoplasms with a first established diagnosis, in the second five-year period compared with the first, an increase in the incidence rate was found in the western (by 1,5%), northern (by 1,8%), central (by 7,6%) and southern (5,1%) zone (table 2) [2,4].

Materials and Data

The average for Republic of Karakalpakstan over the first five-year period (2009-2013) the primary incidence rate of malignant neoplasms (65,8 per 100 000), high rates were observed in Muinak (85,9), in Nukus (74,8), in Chimbay (72,6), in Kegeyli (71,6), in Kanlykul (71,4) districts and the city of Nukus (73,8).

In the next five-year period, the regional (Republic of Karakalpakstan) average was 68,9 cases per 100 000, relatively high primary incidence rates of malignant neoplasms were recorded in Chimbay (82,0), Nukus (81.3), Takhtakupyr (78,3), Muynak (77,9), Khodjeyli (76,4), Kanlykul (73,1) districts and in the city of Nukus (75,1) (Table 2). Relatively low primary incidence rates of malignant neoplasms were detected in the first five-year plan in Shumanay (45,7) and Ellikkala (45,4) districts.

The highest incidence rates of malignant neoplasms were recorded in 2009, 2011 and 2013. in Muynak district (84,2; 96,9 and 92,1 respectively), in Kanlykul in 2009 and 2012 (86,0; 106,5). The lowest rates were observed in Ellikkala district in 2012 (21,2) and in Shumanay - in 2009 (32,0).

Table 1. Primary incidence rates of malignant neoplasms in the Republic of Karakalpakstan per 100,000 populations [7]

City, districts	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Muinak	84,2	77,5	96,9	79,0	92,1	87,8	83,3	66,2	78,2	74,0
Kungrad	67,7	67,2	48,5	64,4	63,7	59,6	66,0	65,5	66,7	55,6
Kanlykul	86,0	43,1	57,1	106,5	64,4	57,2	50,1	87,0	97,2	74,0

Shumanai	32,0	46,0	59,5	49,6	41,6	41,2	72,4	57,2	52,8	56,0
Western zone	67,5	58,5	65,5	74,9	65,5	61,5	68,0	69,0	73,7	64,9
Takhtakup yr	90,0	50,8	81,4	59,4	64,6	67,0	66,7	71,6	60,6	125,6
Karauzyak	48,8	57,3	80,4	65,4	56,7	54,0	75,1	59,1	79,3	72,8
Chimbay	69,1	82,8	74,9	70,3	65,9	67,0	82,5	93,5	92,7	74,2
Kegeyli	63,1	71,3	74,9	70,7	78,2	61,0	62,5	71,3	70,1	78,5
Northern zone	67,8	65,6	77,9	66,5	66,4	62,3	71,7	73,9	75,7	87,8
Nukus city	73,3	79,7	75,7	59,7	80,4	74,9	81,7	67,2	80,9	70,6
Nukus district	69,6	67,1	79,2	83,7	74,3	82,8	70,3	91,1	98,5	63,8
Khodjeyli	50,1	65,5	84,6	69,9	68,4	75,9	84,3	58,7	100	63,1
Takhiatash	64,7	60,9	65,7	78,2	x	x	x	x	79,7	62,2
Central zone	64,4	68,3	76,3	72,9	74,4	77,9	78,8	72,3	89,8	64,9
Amudarya	58,5	71,7	60,6	55,3	62,9	41,0	46,7	53,9	56,3	67,7
Beruni	68,1	74,2	67,9	62,6	62,8	58,1	63,8	63,8	60,9	67,8
Ellikkala	41,5	59,5	43,2	21,2	61,8	45,8	66,9	52,5	74,0	57,0
Turtkul	65,0	52,6	53,1	45,9	85,4	76,1	64,7	85,6	84,5	59,5
Southern zone	59,4	65,0	56,0	47,0	69,1	55,3	60,5	64,0	68,9	63,0
Karakalpa kstan Republic	63,7	67,3	68,5	59,8	69,9	63,6	69,6	67,8	76,1	67,2
Uzbekista n Republic	68,4	71,0	65,9	64,5	66,2	65,7	67,7	66,7	70,2	71,0

Note: x-Takhiatash was included in the Khodjeyli district

The analysis of indicators of the primary incidence of the child population of the Republic of Karakalpakstan for 2009-2018 in the context of districts and conventionally identified zones, its dynamics by years and two five-year periods (Table 1) showed that the average level of primary incidence in children per 1000 child population for 2016-2018 was in the RUz - 585.9, in the Republic of Karakalpakstan - 478.1 i.e. 22% lower than in Republic of Uzbekistan.

Table 2. Indicators of primary incidence in children under 14 years old per 100 000

City, districts	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Muynak	353.9	418.8	508.6	414.1	463.7	529.2	544.4	473.8	354.3	499.9

Kungrad	533.9	469.6	487.4	458.0	427.5	400.6	347.2	449.2	1823.6	462.0
Kanlykul	508.4	341.4	623.5	457.4	402.1	476.7	550.8	430.7	190.7	451.0
Shumanay	270.7	331.4	574.8	458.5	456.5	463.5	459.0	962.4	948.6	834.3
Western zone	416.7	390.7	548.6	447.0	437.5	467.5	475.4	579.0	829.3	561.8
Takhtakupyr	483.5	554.9	688.9	637.1	654.4	658.9	683.1	688.2	366.4	735.5
Karauzyak	670.7	587.6	771.5	994.3	657.5	689.2	593.5	412.4	548.1	398.4
Chimbay	208.2	270.6	237.7	208.6	168.7	174.4	194.4	421.7	892.3	477.8
Kegeyli	537.3	554.4	402.4	393.0	297.3	287.7	334.1	507.5	379.7	494.6
Northern zone	474.9	491.9	525.1	558.3	444.5	452.6	451.3	507.5	546.6	526.6
Nukus city	292.7	299.9	281.5	280.3	303.0	411.4	393.8	283.5	283.7	289.5
Nukus district	414.7	475.0	511.5	467.9	392.4	425.5	504.2	541.1	281.2	555.9
Khodjeyli	589.6	538.4	494.0	548.3	451.9	339.9	359.6	431.9	606.8	318.7
Takhiatash	542.1	470.0	600.0	568.6	x	x	x	x	122.3	396.5
Central zone	459.8	445.8	471.8	466.3	382.4	392.3	419.2	418.8	323.5	390.2
Amudarya	345.5	421.8	574.8	663.8	498.4	376.0	388.2	631.9	969.3	557.4
Beruni	512.0	579.5	641.0	669.3	700.1	694.4	735.4	482.9	617.1	459.1
Ellikkala	240.3	367.0	367.1	395.9	348.7	514.3	511.7	673.9	533.5	688.9
Turtkul	614.2	639.2	570.1	639.0	620.2	652.1	605.9	523.6	538.8	436.2
Southern zone	428.0	501.9	544.3	599.2	541.9	559.2	560.3	578.1	664.7	535.4
Karakalpakstan Republic	430.9	450.5	478.4	493.8	446.4	461.6	460.2	490.1	470.3	473.9

Note: x-Takhiatash was included in the Khodjeyli district

Results and Discussion

Thus, the results of identifying socio-economic factors on the health of the population, obtained annually and analyzed in dynamics for at least five years, are an integral part of the socio-hygienic monitoring of the information and analytical basis of a comprehensive health risk management system and ensuring sanitary and epidemiological well-being of the population. It is also necessary to create prerequisites for further special scientific research to establish causal relationships "socio-economic factors - health status of the population" and assess the risk of the influence of these factors. One of the main factors influencing the health of the population is the provision of the population with drinking water. At present, the provision of the population of the Republic of Karakalpakstan with centralized water supply is about 60%, the rest of the

population uses water from open reservoirs and well water, mainly in the winter months. One third of the wells has a mineralization of up to 3 mg/l, another third - from 3 to 6 mg/l (suitable for economic purposes) and the remaining one third - over 6 mg/l - unsuitable for drinking and household purposes. Well mineralization depends on proximity to freshwater open water.

We have studied the dynamics of the chemical pollution of water in open reservoirs by districts and zones of the Republic of Karakalpakstan for 2009-2018, for the subsequent determination of its impact on the primary incidence of children (Table 3) [1].

The level of chemical pollution of water in open reservoirs is increasing over the years, especially in the northern and southern zones of the Republic of Karakalpakstan.

Comparison of the dynamics of indicators of primary incidence in children under 14 years old (inclusive) of the Republic of Karakalpakstan for 2009-2018 with indicators of chemical pollution of water in open reservoirs showed the following results.

Table 3. Percentage of water samples from open reservoirs that do not meet hygienic requirements in terms of chemical indicators for 2009-2018

City, districts	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Muynak	60,8	24,3	19,4	8,3	16,7	36,9	29,9	17,0	18,2	10,6
Kungrad	25,4	30,1	37,3	48,8	41,3	7,6	0,9	28,3	20,2	32,0
Kanlykul	73,5	100	100	100	100	100	96,4	100	100	100
Shumanay	29,4	30,8	36,9	33,3	36,2	28,2	31,3	31,7	30,1	45,8
Western zone	47,3	46,3	48,4	47,6	48,6	43,2	39,6	44,3	42,1	47,1
Takhtakupyr	100	72,5	100	100	100	100	100	100	100	100
Karauzyak	46,0	42,9	31,0	35,8	31,2	23,3	36,8	22,5	26,0	27,3
Chimbay	4,8	15,3	13,6	6,3	1,5	9,6	19,8	18,8	12,6	15,5
Kegeyli	11,1	20,0	0,0	0,0	26,3	36,4	71,4	75,0	94,0	76,6
Northern zone	40,5	37,7	36,2	35,5	39,8	42,3	57,0	54,1	58,2	54,9
Nukus city	23,1	12,2	37,5	27,3	31,4	24,7	41,9	40,8	45,1	41,4
Nukus district	75,0	50,0	77,8	52,2	100	77,8	13,0	95,0	100	84,3
Khodjeyli	20,7	28,9	12,9	10,3	14,3	21,9	30,2	31,5	49,5	51,4
Takhiatash	16,3	0,0	43,3	36,4	x	x	x	x	75,0	21,0
Central zone	33,8	22,8	42,9	31,6	48,6	41,5	28,4	55,8	67,4	49,5
Amudarya	72,2	89,9	97,3	5,8	30,6	78,0	81,1	77,5	73,6	63,5
Beruni	69,0	51,0	82,0	83,6	90,3	59,1	63,3	78,0	26,7	69,0
Ellikkala	20,0	83,3	95,8	0,0	85,7	25,7	40,9	37,8	100	100

Turtkul	100	82,9	100	100	100	91,7	70,0	87,0	100	100
Southern zone	65,3	76,8	93,8	47,4	76,7	63,6	63,8	70,1	75,1	83,1
Karakalpakstan Republic	41,9	39,4	43,5	31,3	38,3	48,7	45,4	55,8	47,9	49,9

Conclusions

The solution to the problem of the consumption of contaminated water by the population for drinking purposes is to maximize the coverage of the population of the allocated districts with centralized water supply and bring the quality indicators of the tap water supplied to the population in accordance with the state standard.

However, the level of primary incidence in children under 14 years of age in the Republic of Karakalpakstan for the 10-year period 2009-2018 has an upward trend. The level of chemical pollution of water in open reservoirs also tends to grow, especially in the northern and southern zones of the Republic of Karakalpakstan.

Our results can contribute to planning the reduction of the pollution of the environment, providing a measure for a differential approach for specific territories of the Republic of Karakalpakstan.

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