



Impact of Atmospheric Air Pollution on the Medical Geographical Situation (In the example of Tashkent region)

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Abstract: In this article, the impact of atmospheric air pollution on the medical geographical situation is highlighted in the example of the Tashkent region. Information about toxic substances polluting atmospheric air and their sources is given. Some aspects of population morbidity indicators of the Tashkent region related to atmospheric air pollution are highlighted.

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1. Introduction

As we know, the gas composition of the atmosphere is almost constant. Its composition consists of 78.09% nitrogen, 20.95% oxygen, 0.93% argon, and 0.03% carbon dioxide gases. At the same time, helium, neon, xenon, hydrogen, krypton, methane, ammonia, iodine, radon gases and 3-4% of water vapour and dust are also present. Nowadays, the composition of atmospheric air is observed to be polluted with various harmful compounds. Atmospheric air ammonia, carbon monoxide, sulfur dioxide, nitrous oxide, methane, carbon dioxide and gases, organic and inorganic, such as chlorofluorocarbons solid particles being damaged by pollutants as one of the main reasons for this is emissions from industrial enterprises, transport and other sources of pollution. Air pollution affects the medical-geographic situation[2]. Because the polluted air creates time for the increase of various diseases among the population[4]. As a result of atmospheric air pollution, various allergic diseases, diseases of the respiratory organs, and diseases of the cardiovascular system increase in people. At the same time, dangerous lung cancer is caused by polluted air. According to WHO data, every year on average 7-8 million people around the world die due to atmospheric air pollution [5]. Therefore, it is important to identify and analyze the relationship between atmospheric air pollution and the medical-geographical situation.

2. Main part

Atmospheric air pollution is one of the main environmental problems in the Republic of Uzbekistan.

The fact that the cities are mainly located in the mountainous and intermountain depressions, and the hot and dry climate have led to a relatively high level of air pollution in Uzbekistan. The atmospheric air in Uzbekistan is heavily polluted, especially in the economic regions of Tashkent and Fergana, where the population, industry and transport are highly concentrated. The level of air pollution is very high in the cities of Almalyk, Tashkent, Fergana, Bekobod, Andijan, Chirchik, and Navoi, which are centres of metallurgy, chemistry, and mechanical engineering. Some of these cities have photochemical smog phenomena that exceed the REM for several harmful compounds. Various compounds are released into the atmosphere in Uzbekistan. More than 50 per cent of harmful compounds are carbon monoxide (CO). In our country, automobile transport is in the first place (40%), the energy industry is in the second place (20%), the production of enterprises and organizations is in the third place (14%), agricultural production, household utility industry and others (26%) are the next places of pollution. The atmosphere is monitored by the State Ecology Committee 3 times a day - at 07:00, 13:00, and 19:00. At the national level, atmospheric air pollution is monitored at 63 stationary stations in 25 cities [7].

In 2018, 2 million 449 thousand tons of toxic gases were released into the atmosphere in the territory of our republic. 60 per cent of them are motor vehicles. According to the information provided by the State Ecology Committee, in the last 10 years, Denov, Ko'kan, Gulistan, and Samarkand were among the least polluted cities, while the worst performance was observed in Almalyk, Angren, and Bukhara. All types

of motor vehicles emit more than 200 harmful substances into the atmosphere, particularly carbon, aldehydes, soot, and nitrogen oxides. These substances accumulate in the upper parts of the atmosphere where people breathe, and they react under the influence of ultraviolet rays and turn into more harmful compounds. The Ecology Committee reported that industrial enterprises accounted for 36.2% of the total substances released into the atmosphere in 2018. Most of the industrial facilities, i.e. 37.9 per cent, belong to the Tashkent region. In 2018, the Tashkent region emitted the most 336,600 tons of waste into the atmosphere. When this indicator is analyzed by regions, the highest share is 46.5%. According to the State Ecology Committee, a total of 924,000 tons of harmful substances were released into the atmosphere in 2020 in Uzbekistan. This year, the highest level of harmful substances released into the atmosphere was recorded in the Tashkent region. This year, 430,000 tons of harmful substances were released into the atmosphere in the region. In 2022, 873,600 tons of harmful substances were released into the republic's atmosphere. Tashkent region produced the most 438,000 tons of waste by territorial units this year[7]. Traditionally, there are many production enterprises in the Tashkent region, which is why harmful substances are released into the atmosphere. In particular, as a result of the activities of enterprises and factories such as Ohangaron and Bekobod cement plants, Maksam-Chirchik, Almalyk mining and metallurgical combine, a lot of harmful waste is released into the environment.

Bostonliq district is the region with a low level of atmospheric air pollution in the region. As a result of the monitoring of the state of atmospheric air pollution organized by Uzgidromet, it was noted that the amount of dust in the atmospheric air did not exceed the permitted standard amount established in the Republic. It was also found to be in line with the standards recommended by the World Health Organization (WHO) (RM 2.5 - 5 $\mu\text{g}/\text{m}^3$, RM 10 - 15 $\mu\text{g}/\text{m}^3$)[7].

Tashkent region is considered an industrialized region in the republic, and it is required to regularly carry out state control over the ecological situation in this region, as well as monitoring of sources of environmental pollution. At the moment, 1932 facilities are operating in the region, of which 610 of them correspond to objects of high and medium levels of environmental impact. The remaining 1,322 are low-impact and local-level objects[6].

Currently, more than 60% of the population of Tashkent region is affected by various diseases due to the amount of harmful substances released into the atmosphere from the cities of Angren, Ohangaron and Almalyk of Tashkent region.

If we analyze the types of waste that pollute the air in Angren, they mainly include toxic substances such as dust, nitrogen II oxide, sulfur II oxide, carbon monoxide, nitrogen oxide, and phenol. The share of these substances has increased over the years (Table 1).

Table 1. The average amount of air pollutants in Angren (average pollution - mg/m³)

Toxic substances	1995	2000	2010	2020	2022	Average daily REM
Dust	0.3	0.19	0.22	0.25	0.26	0.15
Nitrogen II oxide	0.03	0.03	0.025	0.034	0.036	0.04
Sulfur II oxide	0.011	0.009	0.011	0.008	0.006	0.05
Carbon monoxide	3.0	1.0	2.1	2.75	2.8	3.0
Nitrous oxide	0.01	0.01	0.019	0.036	0.04	0.06
Phenol	0.003	0.003	0.0025	0.003	0.0029	0.003

Source: The table was compiled based on the Republic of Uzbekistan Ministry of Ecology, Environmental Protection and Climate Change information.

If we pay attention to the diseases observed among the population in the territory of Angren city (Table 2), we can witness that respiratory diseases are observed the most. The reason for this is the large amount of toxic substances that harm the respiratory system in the city. An average person breathes 25 kg of air per day. As a result, harmful dust, soot and gases in the air accumulate in the body. This gradually weakens the human body, and eventually, the body

loses its ability to adequately resist various infections. This area is contained in the atmospheric air under the influence of carbon dioxide, and the nervous, nutritional, and respiratory systems are damaged. Sulfur oxide damages the nervous system, respiratory organs, and vision, sulfur dioxide causes skin burns and damage to the respiratory system[1]. Nitrogen oxides can cause lung inflammation, respiratory arrest, and even death. Due to these factors, respiratory

diseases are the most observed in the city of Angren, followed by diseases of blood circulation, hematopoietic system, and digestive diseases (Table 2).

Table 2. Curable diseases among the population of the city of Angren
(per 100,000 people)

	General morbidity				
	2018	2019	2020	2021	2022
Total diseases	72720.1	74979.6	72569.7	66497.7	71436.2
Infectious and parasitic diseases	2687	2777.5	4620.2	3554	3203.1
Total new tumours	679.2	672.3	590.4	667.1	671.2
Disorders of endocrine glands, nutrition and metabolism	5047.7	6026.1	5235.1	5672	5780
Diseases of the blood and blood-forming organs, some disorders related to the immune mechanism	6199.8	5190.8	5028.5	4980	5890
Mood and behavior disorders	1126.4	1149.9	1131.4	1099.8	1123.1
Diseases of the nervous system	3641.1	3803.7	3213.2	2636.6	3135
Diseases of the eye and its appendages	3641.3	2977.5	2716.8	2401.7	2869.7
Ear and mammary tumour diseases	726.5	1501.1	1325.2	1286	1365
Diseases of the circulatory system	9468	10766.2	11484.8	10889	10934.3
Diseases of respiratory organs	18242.7	19439.1	16806.5	14416.5	15568.7
Diseases of digestive organs	4985.3	4840.6	5686.9	5502.8	5678
Diseases of the genitourinary system	4425.2	3951.6	3747.4	3117.6	3608
Skin and subcutaneous tissue diseases	4983.5	5264.5	5147.5	5157.1	5234.3

Source: The table was compiled by the author based on the data of the Statistical Committee of the Republic of Uzbekistan.

Another industrialized city in the Tashkent region is the city of Almalyk. In this city, many toxic substances are released into the environment, especially into the atmosphere. More than 350 organizations and joint-stock companies of industrial enterprises are operating in the city of Olmaliq. The largest of these enterprises is the Almalyk Mining and

Metallurgical Combine. The combine is the source of the most harmful compounds in the environment (Table 3). As a result of the operation of this plant, sulfur gas, a lot of dust and solid compounds are released into the air[1]. As a result, many diseases will break out among the population living in this city, and the medical geographical situation will worsen.

Table 3. The amount of waste released into the environment from enterprises in the city of Almalyk (thousand tons)

Enterprises	Years				
	1995	2000	2010	2020	2022
Almalyk sh. according to	106.6	99.4	89.5	84.4	83.7
Almalyk Mining and Metallurgical Combine	103.2	96.8	94.21	91.3	93.6
Household chemical plant	0.039	0.04	0.035	0.25	0.24
Chemical plant	1.26	2.01	2.16	2.1	2.0
Furniture Combination	0.059	0.008	0.027	0.014	0.013

Source: The table was compiled according to the Republic of Uzbekistan Ministry of Ecology, Environmental Protection and Climate Change data.

In the city of Almalyk, diseases of the cardiovascular system take the first place in the number of diseases that occur among the population under the influence of pollutants in the air. Because the elements of the geographical crust are interconnected, polluted atmospheric air hurts other components of nature. As a result, negative changes occur in the natural state of water and soil, in the human body, and in the flora and fauna. The cardiovascular system of the human body is damaged. This, in turn, causes other related diseases, in particular, blood pressure increases, and causes an increase in cancer, bronchitis and lung diseases[3]. For this reason, in the urban area, diseases of the respiratory system are second only to diseases of the cardiovascular system (Fig. 1). In the city of Almalyk, there are factories and factories around the

village Fatty substances, dusts in various productions, inorganic dusts, cement dust cause deterioration of the physiological condition of the respiratory tract, deterioration of the central nervous system, severe headache and other conditions. If we go to the city of Almalyk and observe the situation there, we can see with the naked eye that toxic substances coming out of factories and factories are directly added to the clouds in the air in the form of smoke. In addition, if you move away from the city, you will clearly witness that the city is covered with toxic chemical dust. The people living in this area breathe this air every day. Among the residents living here, there are not a few people suffering from skin, stomach and similar diseases. This means that the medical-geographic situation is in a rather unsatisfactory state.

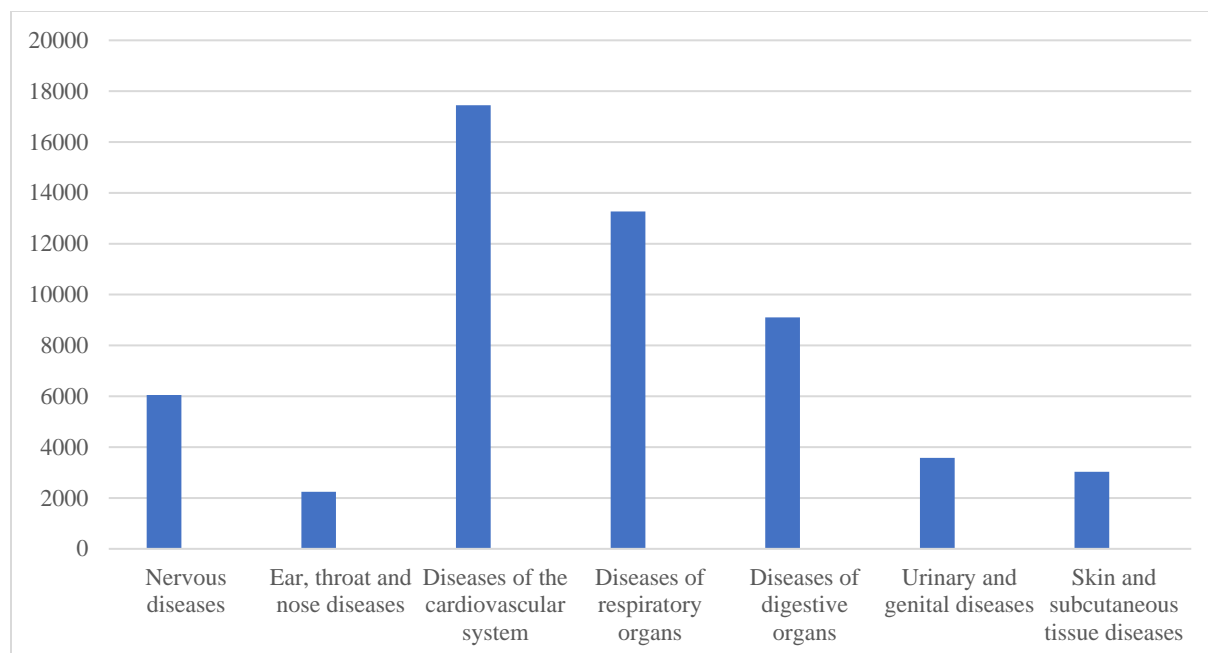


Figure 1. Common diseases among the population of Almalyk (per 100,000 people)

Another largest industrialized city of the Tashkent region is Ohangaron. The city of Ohangaron is also included in the category of settlements where the ecological situation is becoming more complicated. The industrial enterprises of the city occupy a significant place in the national economy, and the waste emitted from their smokestacks into the environment causes air, water and soil pollution. Gaseous compounds emitted from fuel, energy, building materials, and industrial enterprises in the city pollute the city's air. The enterprises of the joint-stock companies "Ohangaronsement" and "Ohangaron-

ranglissement", Ohangaronshifer" are more affected by the air pollution of the city (Table 4). Waste from these enterprises is released into the environment in solid and gaseous form. This also affects the health of the city's residents, as above. From the enterprises of "Ohangaronsement" and "Ohangaron-ranglissement, Ohangaronshifer" joint-stock companies Fatty substances, dusts from various productions, inorganic dust, cement dust cause deterioration of the physiological condition of the respiratory tract, deterioration of the central nervous system, severe headache and other conditions[1].

Table 4. Amount of waste released into the environment from Ohangaron enterprises, thousand tons.

Enterprises	Years							
	2000	2010	2020	2022	2000	2010	2020	2022
	Solid waste				Gaseous			
Iron-cement	4.4	4.3	3.6	4.1	2.4	2.2	2.3	2.1
Iron coloured cement	203.7	262.1	249.1	279.7	69.11	81.36	76.22	74.24

Source: The table was compiled based on the information of the Republic of Uzbekistan Ministry of Ecology, Environmental Protection and Climate Change information.

The most common group of diseases in the urban area is diseases of the cardiovascular system (Fig. 2). Diseases of respiratory organs and digestive organs take the next place. In the city of Ohangaron, hematopoietic diseases also have a significantly higher rate. Anemic diseases mainly affect this. The main reason for the high prevalence of digestive diseases

and anaemia in this area is that air pollution is causing negative changes in the soil, water and vegetation, and these changes are affecting people's health. will give. So, in this industrialized city of Tashkent region, due to air pollution, the medical-geographical situation worsened and the time was created for the outbreak of various diseases among the population.

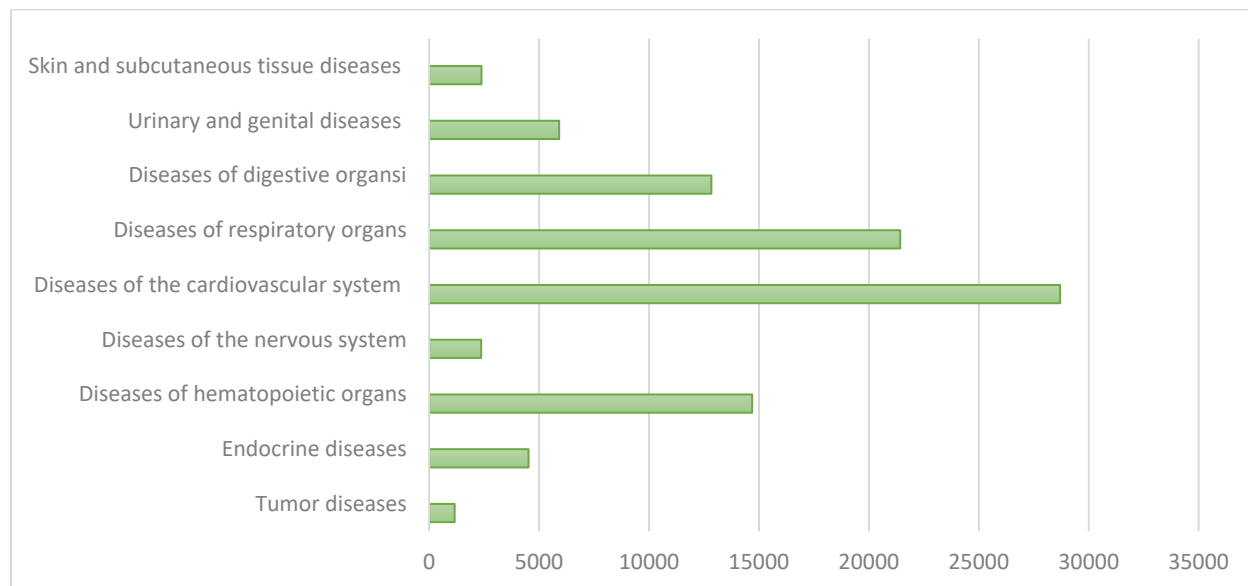


Figure 2. Common diseases among the population of Ohangaron (per 100,000 people)

3. Conclusion

In conclusion, the volume of release of various toxic substances into the atmospheric air is much higher in industrialized areas. We have clearly witnessed this in the example of the cities of the Republic of Uzbekistan in the Tashkent region, where there are many large industrial enterprises. As a result of atmospheric air pollution, the burden of many diseases among the population increases significantly. In particular, diseases of cardiovascular and respiratory organs can reach the highest rates. At the same time, diseases related to digestive organs, skin diseases, malignant tumour diseases, and anaemia in diseases of blood-forming organs also increase. Atmospheric air pollution has a negative effect on other elements, that is, water, soil cover, and vegetation, and as a result, various diseases can develop among the population. Therefore, the medical-geographical situation becomes negative and worsens as a result of atmospheric air pollution. For this reason, it is important to develop measures such as identifying, eliminating and preventing the dangerous aspects of these processes.

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