Urban Environment Change and Population Morbidity

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Annotation: Retrospective analysis of general and primary morbidity of population of the Republic of Uzbekistan for 5-year period showed that general morbidity of population increased by 7.7%. The leading pathology among population is diseases of respiratory organs, blood and blood forming organs, digestive organs, circulatory system and endocrine system diseases, nutritional disorders, metabolic disorders, which account for 68% of all diseases from 19 classes of diseases studied.

Experiments on measuring air temperature in different urban conditions showed that unshaded green spaces and unventilated surfaces of infrastructure objects, warmed by direct sunlight, still radiate heat for a long time after sunset. Reflected radiation slows nighttime air cooling and significantly prolongs the time of overheating of the environment, which led to a deviation of the average monthly minimum air temperature from the norm in July 2021 by 4.5^0.

Keywords: Environmental determinants of health, Public health, Urban planning, Air polution

INTRODUCTION

The main centers of the emergence of environmental problems and the concentration of the main part of the inhabitants of the Earth are cities. Sustainable development of a modern city is an urgent task aimed at ensuring a high quality of urban environment and quality of life of citizens, equilibrium of the city and the natural environment. A modern city with sustainable development should be beautiful, healthy, satisfying the needs of citizens and in harmony with the environment [1].

According to the Sustainable Development Goals, a sustainable city is a city in which the improvement of the quality of human life is achieved in harmony with the improvement and maintenance of the health of ecological systems, and where the industrial base of a healthy economy supports the quality of both human and ecological systems [2]

In comparison to traditional urban planning approaches, a sustainable urban strategy gives equal weight to: the entire community (not just disadvantaged residential neighborhoods); ecosystem protection; meaningful and active citizen participation in decision-making; and economic self-sufficiency [5, 6].

Hygienic researches pay much attention to the intra-residential environment and the significance of the urban environment for public health [5, 6]. Assessment of the quality of the urban environment is associated with the need to move from spontaneous to controlled problems of urbanization [3, 7] and the implementation of monitoring of the living environment with the allocation of risk factors, the establishment of quantitative patterns between the quality of the living environment and public health, identifying priorities and developing on their basis a system of measures to optimize urban living environment are important part of the sanitary and epidemiological well-being of the population [4].

The process of urbanization has a certain impact on the health of the population and the urban environment, which are emerging in large and medium-sized cities of the 21st century. This is especially noticeable in the context of climate change, the processes of global warming, which affect with the process of urbanization of the planet, affecting natural resources (air, water, soil), urban infrastructure (housing and transport) and health systems [4].

MATERIALS AND METHODS

An observational (descriptive) study was conducted. The statistical data of the state reporting on health care, as well as materials of the State Committee on Statistics of the Republic of Uzbekistan for the period 2012-2016 and analysis of data from the hydrometeorological center of the republic for the 7-year period were used in the work. Morbidity was analyzed per 100,000 population in terms of "total registered" and "first-time diagnoses". Calculations and graphical analysis of the data were performed using Microsoft Excel

RESULTS AND DISCUSSION

According to the State Statistics Committee of the Republic of Uzbekistan, the average annual population of the republic is growing. So in 2021, the total population was 34,131,615 people, which is 5,383,263 people more than in 2011 and the growth rate was 18.7%. The process of urbanization and changes in the distribution of the population of the republic between the village and the city are relevant for Uzbekistan. In accordance with the agrarian orientation of the sectoral structure of the economy, there was a significant predominance of the rural population. In 2011, the share of the rural population was 57.3%. After organizational and administrative measures were taken to accelerate urbanization processes, which consisted in the transformation of a number of rural settlements into urban settlements, led to a decrease in the proportion of rural residents. However, in subsequent years, the proportion of the urban population gradually decreased, mainly due to the persisting differences in birth rates between the countryside and the city, as well as due to migration. So in 2021, the share of the urban population of the republic has a slight but stable decline and amounted to 50.8% compared to 2011, 57.3%.

Analyzing the dynamics of the incidence of the population of the Republic of Uzbekistan over the 5-year period, showed the total incidence in the period 2012-2016 increased by 7.7% according to a retrospective analysis of the general and primary morbidity of the population of the Republic of Uzbekistan. There were respiratory diseases, blood and hematopoietic organs, digestive system, circulatory system and the endocrine system diseases, which account for 68% of all the 19 classes of diseases as the leading pathology among the population.

It was underlined a decrease in the level of perinatal pathologies and the number of congenital anomalies and chromosomal disorders along with the high rates of increase in a number of diseases classes. That was one of the indicators of effective maternity and childhood strategy implemented in the republic.

The ranking of indicators of the general morbidity of the population in the context of regions made it possible to identify the regions of the republic that are leading in terms of the level of general morbidity. Thus, the highest level of general morbidity was noted among the population of Tashkent (129231.12 ± 63.2), Fergana region (98480 ± 9.6), the Republic of Karakalpakstan (93959.36 ± 3.1), Khorezm (91466.62 ± 6.6) and Navoi (90031.96 ± 14.3) regions. Analysis of the structure of general morbidity showed that among the population of Tashkent city, the structure is determined mainly by diseases of the respiratory system (23.8%), the digestive system (18.6%), blood and hematopoietic organs (8.6%), the circulatory system (6,2%) and diseases of the endocrine system (6.2%), which together accounted for 63.3% of the total morbidity structure of the city's population. The population of the city of Tashkent, in comparison with other regions, has the highest growth rate of the overall morbidity, which is 40%.

According to the Service of Hydrometeorological Center of the Republic of Uzbekistan, urban environment is characterized by a large variety of active surfaces with different ability to absorb solar radiation, which creates spatial heterogeneity of temperature, humidity and wind fields. The main properties of active surfaces, determining the peculiarity of their thermal regime, are albedo and evaporation capacity. Under the same insolation conditions, non-evaporating surfaces (asphalt, concrete, etc.) almost always have a higher

temperature than evaporating surfaces (lawns, trees, moist soil). The temperature of insolated underlying surfaces on a cloudless day in the morning hours exceeds the air temperature by at least 10⁰C, in the afternoon hours this difference exceeds 20⁰C. Studies have shown that the temperature of insolated underlying surfaces can exceed the air temperature by 30⁰C or more, but these cases are rare and occur only on hot days with a weak wind, leading to a significant deterioration of micro- and bioclimatic regimes of the city.

Experiments to measure air temperature in different urban environments have shown that unshaded green spaces and non-smoldering infrastructure surfaces, warmed by direct sunlight, still radiate heat for a long time after sunset. Reflected radiation slows nighttime air cooling and significantly prolongs the time of ambient overheating. This is clearly evidenced by a significant increase in nighttime temperatures in recent years (Figure 1). Deviation of average monthly minimum air temperature from the norm in July 2021 was 4.6⁰.
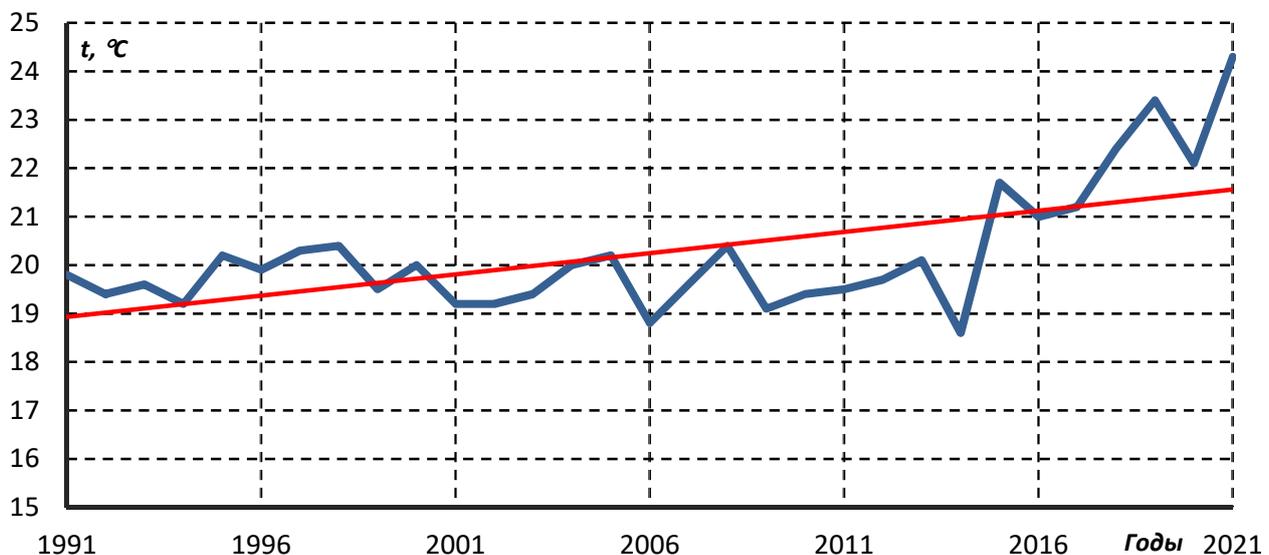

Figure 1. The course of the average minimum air temperature for July in Tashkent

Research by many scientists has proven that the most effective mechanism for improving the ecological situation of cities is their landscaping. Creation of green areas in parks, squares, landscaping of pedestrian zones, green areas in areas of urban development, increasing the number of water bodies, fountains - all these activities contribute to the improvement of urban environment, have a positive effect on the thermal regime of the city. Ameliorative value of green spaces for the city in a hot climate is great. They have a great impact on reducing air pollution, reduce noise, lead to oxygen enrichment of the air. The most significant effect of vegetation is manifested in the mitigation of heat loads on the human body due to the shielding from direct sunlight, both the person himself and the areas of surfaces under the plantations.

Artificial sunscreens are most often ineffective, because as they warm up, they become additional sources of increased radiation. Tree canopies, unlike artificial sunscreens, are not sources of significant radiation fluxes and are the most effective means of protection against insolation.

Vegetation, having a large evaporation capacity, has a noticeable effect on humidity and air temperature, causing a positive feeling of warmth to humans.

CONCLUSION

Retrospective analysis of general and primary morbidity of population of the Republic of Uzbekistan for 5-year period showed that general morbidity of population increased by 7.7%. The leading pathology among population is diseases of respiratory organs, blood and blood forming organs, digestive organs, circulatory

system and endocrine system diseases, nutritional disorders, metabolic disorders, which account for 68% of all diseases from 19 classes of diseases studied.

Experiments on measuring air temperature in different urban conditions showed that unshaded green spaces and unventilated surfaces of infrastructure objects, warmed by direct sunlight, still radiate heat for a long time after sunset. Reflected radiation slows nighttime air cooling and significantly prolongs the time of overheating of the environment, which led to a deviation of the average monthly minimum air temperature from the norm in July 2021 by 4.5º.

REFERENCES

1. Neiderud CJ. How urbanization affects the epidemiology of emerging infectious diseases. Infect Ecol Epidemiol. 2015;5:27060. Published 2015 Jun 24. doi:10.3402/iee.v5.27060;

2. Jeffrey D. Sachs, Christian Kroll, Guillaume Lafortune, Grayson Fuller, and Finn Woelm. Sustainable Development Report 2021. The Decade of Action for the Sustainable Development Goals. UN. 2021: 518 p.;

3. Sabel CE, Hiscock R, Asikainen A, Bi J, Depledge M, den Elshout S, et al. Public Health impacts of city policies to reduce climate change: findings from the URGENCHE EU-China project. Environ Health. 2016;

4. Vardoulakis, S., Dear, K. & Wilkinson, P. Challenges and Opportunities for Urban Environmental Health and Sustainability: the HEALTHY-POLIS initiative. S30 (2016). https://doi.org/10.1186/s12940-016-0096-1;

5. Woods M, Crabbe H, Close R, Studden M, Milojevic A, Leonardi G, et al: Decision support for risk prioritisation of environmental health hazards in a UK city. Environ Health. 2016, 15 (Suppl 1);

6. Helen P., Yvonne R., Cities, health and well-being. Royal Institution of Chartered Surveyors. London SW1P 3AD. 2018: 40p.;

7. Hsu, A., Sheriff, G., Chakraborty, T. et al. Disproportionate exposure to urban heat island intensity across major US cities. Nat Commun 12, 2721 (2021). https://doi.org/10.1038/s41467-021-22799-5.