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THE IMPACT OF ENVIRONMENTAL FACTORS ON CARDIOVASCULAR HEMODYNAMICS UNDER THE CONDITIONS OF UZBEKISTAN

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Abstract
This article discusses cardiovascular diseases that arise under the influence of harmful environmental factors and methods for their prevention.

Keywords: Hemodynamics, arterial pressure, cardiovascular system, peripheral vascular resistance, blood rheology, vascular elasticity, heart failure, hypertension, atherosclerosis, environmental factors, conditions of Uzbekistan.

Relevance of the Topic

Today, under the conditions of Uzbekistan, the issue of the impact of environmental factors on the functioning of the cardiovascular system, particularly on hemodynamic processes, is of great scientific and practical importance. The worsening ecological situation in the republic, rapid urbanization, an increase in industrial enterprises, growing emissions of harmful gases from transport, and global climate change significantly intensify risk factors for cardiovascular diseases.It should be especially noted that in certain regions of Uzbekistan, particularly in the Aral Sea area, the consequences of ecological disaster have a pronounced effect on public health and, especially, on

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hemodynamic indicators. Salt and chemical particles rising from the dried seabed contribute to fluctuations in arterial pressure, disturbances in vascular tone, and a decline in the heart's pumping function.Another important issue is the insufficient development of specialized programs aimed at identifying early functional changes in the cardiovascular system among women of reproductive age and adolescents. This situation increases the risk that hemodynamic disorders will later develop into severe chronic pathologies. In addition, the shortage of diagnostic equipment in the healthcare system and the limited use of modern invasive and non-invasive diagnostic methods slow down scientific and practical progress in this field.

Overall Mortality and the Contribution of Cardiovascular Diseases

From January to September 2024, a total of 131.7 thousand deaths were recorded in Uzbekistan. Of these, 57.2% were caused by circulatory (cardiovascular) diseases.

Cardiovascular Diseases as the Leading Cause of Death

According to the article "Terrifying Statistics", 61.1% of deaths in Uzbekistan are attributed to cardiovascular diseases.

According to data from the WHO World Heart Observatory, in 2021, 97,390 people died from cardiovascular diseases in Uzbekistan.

In the same year, the age-standardized mortality rate from cardiovascular diseases was 479 per 100,000 population.

Prevalence of Hypertension

According to the World Heart Observatory, in 2019 the prevalence of hypertension in Uzbekistan was:

- 44.6% among women
- 46.7% among men

Disease Morbidity

According to studies on Central Asian countries, approximately 1.5 million acute and chronic cardiovascular disease cases are registered annually in Uzbekistan.

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Over the past 10 years, the primary incidence rate increased from 1,291 to 1,759 per 100,000 population.

The overall prevalence rate also rose from 4,672 to 5,503 per 100,000 between 2003 and 2013.

Trends

According to Sputnik (2022), mortality from cardiovascular diseases in Uzbekistan reportedly decreased by 56.2%.

Impact of Environmental and Climatic Factors

Changes in Atmospheric Pressure, Temperature, and Humidity

Compared to northern regions, sharp increases in temperature and intensified droughts in southern regions of Uzbekistan exert significant stress on the cardiovascular system, particularly during summer months.

Impact of Climate Change

Hot and arid climatic conditions can lead to blood thickening, increasing cardiac workload and elevating the risk of cardiovascular diseases.

Negative Effects of Air Pollution

In large cities such as Tashkent, atmospheric air pollution negatively affects the development of cardiovascular diseases.

Medical and Environmental Problems

In regions such as the Aral Sea area, severe environmental conditions (dust storms, saline deserts) place chronic stress on the cardiovascular system.

Individual Sensitivity of the Population

People of different ages and health conditions respond differently to environmental factors, making generalization of their effects difficult.

Multiple Environmental Problems in Certain Regions

In some areas of Uzbekistan (e.g., the Fergana Valley), several ecological problems coexist simultaneously, including industrial waste and agricultural chemical exposure, complicating the assessment of their combined effects.

Ways to Address the Problems

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Environmental Factors

• Dust and air pollution: Negatively affect the cardiovascular system and require thorough analysis.

• Heat and humidity: Elevated levels may exacerbate cardiovascular diseases.

• High vibration exposure: In some regions, it may contribute to various diseases.

Geographical and Climatic Factors

• Climate change: Its impact on cardiovascular diseases in Uzbekistan is analyzed.

• Lowland and highland areas: Cardiovascular health of populations living in different altitudes is assessed.

Socioeconomic Factors

• Stress: Its influence on the cardiovascular system is examined.

• Nutrition: The impact of dietary habits on cardiovascular health is analyzed.

• Physical activity: Low levels of physical activity contribute to increased cardiovascular disease risk.

Agriculture and Industry

• Agriculture: The negative effects of pesticides used in agriculture on the cardiovascular system are analyzed.

• Industry: The environmental impact of industrial enterprises is assessed.

Control Measures and the Healthcare System

• Ensuring environmental safety: Measures aimed at improving environmental safety in Uzbekistan are analyzed.

• Healthcare system: Strategies for combating cardiovascular diseases within the healthcare system are evaluated.

Conclusion

In conclusion, environmental factors under the conditions of Uzbekistan significantly affect cardiovascular hemodynamics. Climate, pollution, stress, and

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living conditions alter hemodynamic stability and increase the risk of cardiovascular diseases. Therefore, the following measures are essential:

• Strengthening preventive measures among the population, including increased physical activity, promotion of healthy nutrition, and reduction of salt and fatty food intake.

• Reducing air pollution in industrial and urban areas.

• Developing systems for hemodynamic monitoring and blood pressure control.

To prevent and reduce cardiovascular disease risk, the following are important:

• Stress management through meditation, psychotherapy, and relaxation practices.

• Maintaining a healthy lifestyle, including regular physical activity, balanced nutrition, and avoidance of harmful habits.

• Monitoring and stabilizing blood pressure.

• Paying attention to sleep quality and regularity.

• Undergoing regular medical check-ups for early detection of cardiovascular disease signs.

Monitoring environmental factors and promoting a healthy lifestyle among the population are key strategic directions in the prevention of cardiovascular diseases in Uzbekistan.

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