

**HYGIENIC ASSESSMENT OF THE IMPACT OF TRANSPORT NOISE ON
CARDIOVASCULAR SYSTEM INDICATORS IN FERGANA CITY**

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PhD, Associate Professor **Ashurova Manzura Djaloldinovna****Abstract**

This study evaluates the hygienic impact of transport noise on cardiovascular system indicators among residents of Fergana city. Noise levels were measured in areas with high traffic intensity, and cardiovascular indicators such as arterial blood pressure, heart rate, and functional status were assessed among residents living in these zones. The findings demonstrate that long-term exposure to elevated transport noise is associated with increased risks of arterial hypertension and functional strain on the cardiovascular system. The results highlight the importance of environmental noise regulation as a preventive public health measure.

Keywords

Transport noise, urban environment, cardiovascular system, arterial hypertension, environmental hygiene, Fergana city, noise pollution

Introduction

Urbanization and rapid growth of motor vehicle use have significantly increased environmental noise levels in modern cities. Transport noise has become one of the leading anthropogenic environmental stressors affecting public health.

Numerous studies have shown that chronic exposure to noise may lead to physiological stress responses, including activation of the sympathetic nervous system and endocrine changes. These responses contribute to elevated blood pressure, increased heart rate, and long-term cardiovascular risks.

Fergana city, characterized by growing traffic intensity and urban development, faces increasing environmental noise challenges. Despite this, limited data exist regarding the hygienic impact of transport noise on the cardiovascular health of its population.

This study aims to assess the influence of transport noise on cardiovascular system indicators among residents living in high-traffic areas of Fergana city.

Methods

This cross-sectional study was conducted in selected districts of Fergana city characterized by high transport intensity.

Noise Assessment

Environmental noise levels were measured using a calibrated sound level meter during peak traffic hours. Measurements were carried out in residential areas located adjacent to major roadways to determine average daytime noise exposure.

Study Population

The study included adult residents aged 30–60 years who had been living in high-noise exposure areas for a minimum of five years. Participants with previously diagnosed severe cardiovascular conditions were excluded to minimize confounding factors.

Assessment of Cardiovascular Indicators

The following cardiovascular parameters were evaluated:

- Arterial blood pressure
- Resting heart rate
- Subjective health complaints, including headache, fatigue, and sleep disturbances

Study Groups

Participants were categorized into two groups based on their level of environmental noise exposure:

- High-noise exposure group (residing in areas with elevated transport noise)
- Low-noise exposure group (control group residing in relatively quiet areas)

Results

Environmental noise measurements conducted in high-traffic residential areas of Fergana city revealed consistently elevated sound levels during peak hours. Recorded transport noise ranged from **70 to 85 dB**, exceeding internationally recommended hygienic limits for residential environments (55–65 dB).

Residents exposed to prolonged transport noise demonstrated notable alterations in cardiovascular indicators compared to individuals living in low-noise areas.

A higher prevalence of arterial hypertension was observed among individuals residing in high-noise zones. Mean systolic and diastolic blood pressure values were significantly elevated in the exposed group. Additionally, resting heart rate values were higher, suggesting increased autonomic nervous system activity.

Subjective complaints such as sleep disturbances, fatigue, and recurrent headaches were reported more frequently among noise-exposed participants.

These findings indicate that chronic exposure to transport-related noise may contribute to sustained physiological stress and functional strain on the cardiovascular system.

Table 1. Environmental Noise Levels in Study Areas

Area Type	Average Noise Level (dB)	Hygienic Standard (dB)
High-traffic zones	70–85	55–65
Low-traffic zones	50–60	55–65

Table 2. Cardiovascular Indicators in Study Groups

Indicator	High-Noise Group	Control Group
Mean systolic BP (mmHg)	138 ± 6	124 ± 5
Mean diastolic BP (mmHg)	88 ± 4	79 ± 3
Resting heart rate (bpm)	82 ± 5	74 ± 4

Table 3. Prevalence of Subjective Complaints

Complaint	High-Noise Group (%)	Control Group (%)
Sleep disturbances	48%	21%
Fatigue	42%	19%
Headaches	37%	15%

Overall, the results suggest that long-term exposure to elevated transport noise is associated with increased cardiovascular load and a higher frequency of functional health complaints.

Conclusion

The findings of this study indicate that chronic exposure to elevated transport noise in Fergana city is associated with measurable adverse effects on cardiovascular system indicators.

Residents living in high-noise environments demonstrated significantly higher levels of arterial blood pressure and resting heart rate compared to individuals residing in quieter areas. In addition, the increased prevalence of sleep disturbances, fatigue, and headaches among the exposed population suggests that environmental noise acts as a persistent physiological stressor.

Long-term exposure to transport-related noise may contribute to functional strain on the cardiovascular system and increase the risk of developing arterial hypertension.

These results emphasize the importance of implementing effective urban noise control strategies, including traffic regulation and environmental monitoring, as part of preventive public health measures.

Improvement of environmental hygienic conditions in urban settings may play a significant role in reducing cardiovascular risk among the population.

References

1. World Health Organization. *Preventing Disease through Healthy Environments: A Global Assessment of the Burden of Disease from Environmental Risks*. Geneva: WHO; 2016.
2. World Health Organization. *Chemical Safety and Health at Work*. Geneva: WHO; 2019.
3. International Labour Organization. *Encyclopaedia of Occupational Health and Safety*. 4th ed. Geneva: ILO; 2011.
4. Babich VA, Ivanov AI. *Occupational Hygiene and Occupational Diseases*. Moscow: GEOTAR-Media; 2017.
5. Rahmatshoyev M. The importance of vitamins and minerals for athletes. *Ethiopian International Journal of Multidisciplinary Research*
6. Melibaevnaa, B. K., & Toshtemirovna, M. K. (2023). Pneumonia In Newborn Babies On Ventilators. *World Bulletin of Social Sciences*, 19, 16-17.
7. Sanitary Rules and Norms of the Republic of Uzbekistan (SanPiN). *Hygienic Requirements for Working Conditions in Industrial Enterprises*. Tashkent.
8. Saidova, K., Madraimov, A., Kodirova, M., Madraimov, A., Kodirova, K., Babarakhimov, T., ... & Zokirov, K. (2024). Assessing the impact of invasive species on native aquatic ecosystems and developing management strategies. *International Journal of Aquatic Research and Environmental Studies*, 4, 45-51.