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[1]M. Ainabekov, [1]Y. Uteuliev, [2]A. Tazhiyeva, [1]S. Nurakysh

[1]Kazakhstan's Medical University «KSPH»
[2]Asfendiyarov Kazakh National Medical University

HEALTH IMPACTS OF AIR AND NOISE POLLUTION IN ALMATY CITY AND POSSIBLE SOLUTIONS OF THE PROBLEM

The main causes of health issues in big cities related to environmental problems. Almaty has hazardous impacts to human health from air and noise pollution. Through implementing appropriate measures such as nature-based solutions, which is widespread policy in the most of European countries, the conditions for population can be improved considerably.
Keywords: *healthcare, air and noise pollution, nature-based solutions*

Introduction

Almaty is the biggest city of Kazakhshtan, with approximately 2 million population. Almaty has roughly 20 percent contribution to the gross domestic product of the country. As a result of the urbanization process in Kazakhstan in the recent three decades, the total population of Almaty city has increased by 63,5 percent [14]. Simultaneously the anthropogenic pressure on the environment has increased through air and noise pollution from motorized transport, coal-fired power stations as well as expanding artificial buildings and destroying vegetation, which has severe implications on the population's health. The solutions were proposed in some European and North American countries such as sustainable transport policy, natural-based solutions could be used in Almaty city in order to mitigate the negative impacts of the emerged urban issues [16, 17]. This essay will examine successful practices in some countries to identify better strategies to tackle environmental challenges in Almaty.

According to the recent studies road traffic has been estimated as a major source of air and noise pollution in cities [10]. Pakina and Batkalova (2018) claim that 85 percent of air pollution in Almaty caused by motorized transport, whereas corresponding numbers of noise pollution accounted for 95 percent [5]. It might be resulted by the facts that there are 319 cars per 1000 citizens in Almaty which is the highest rate in Central Asia [4, 18]. It was also discovered that the level of pollution could be worsened depending on buildings height and density [6, 8]. In other words, the ecosystem of Almaty city also has been damaged by replacing green spaces with new lofty buildings, as well as transport and engineering infrastructures in recent years. In a sense, individuals are extremely dependant on microorganisms of the ecosystem thus biodiversity is crucial in their living environment [11].

All those trends, eventually, lead to public health issues [7]. Subsequently, scholars argue that the urbanization challenges have tremendous negative implications on health conditions of the population [8]. This phenomenon accelerates the development of the number of non-communicable illnesses such as cardiovascular diseases, cancer and respiratory illnesses with the enormous death rate. Aryngazina et. al. (2012) claim that non-communicable diseases account for 85 percent of all premature deaths in Almaty [1, 2].

Firstly, it seems that developing the sustainable transport model in Almaty city is the main solution to environmental challenges. Because it tackles the main cause of air and noise pollution. According to the worldwide practice the sustainable transport model is based on two main aspects. One of them is a reduction of energy consumption through increasing alternative transport modes such as electric, hybrid and fuel cell vehicles. This measure may reduce hazardous exposures from the transport in Almaty by 20 to 40 percent within the next three decades [4]. In addition, electric cars are quieter than petrol and oil vehicles, thus, they can considerably reduce noise pollution. The main limitation of this solution is the expensiveness of innovative cars for citizens. Therefore, it could be implemented through governmental programs, which would incentivize energy-efficient transport models. For instance, in Norway and the USA, the purchases of electric cars were encouraged by providing tax credits, free parking access and reduced electric rates [13]. From an economic point of view, electric vehicles are cheaper to maintain rather than cars with conventional engines. They also have ecological friendly car parts, which can be easily recycled. It means that current spendings of the government on storing and disposing of scrap metals from conventional cars can be utilized for new projects. Another aspect of the sustainable transport model is increasing public transport usage, which may considerably reduce air and noise pollution, traffic congestion, significantly minimizes the risks of car accidents in a city. For example, carbon dioxide emission of a bus passenger is 5 times less than someone who travels by a private car. According to the questionnaire the majority of respondents mentioned 'time' as the main obstacle in public transport usage [3]. In the USA and European countries implementing innovative solutions such as Bus Rapid Transit and Transit Signal Priority have evaluated as successful methods in accelerating the pace of public transport [2]. For example, in Bagota the Bus Rapid Transit system has increased the popularity of public transport by dropping down passengers' time on their commutes by approximately 10 hours per month. The higher proportion of public transport users led to the reduction of air pollution by 0.25 tonnes per year [4]. On the other hand, public transport in Kazakhstan associated with poverty, whereas a car is the main attribute of a successful person. So it is important to improve not only infrastructure for the new systems but also to ramp up the quality of buses, underground trains, propose additional amenities such as free broadband, screens for watching short movies. These improvements may facilitate attractiveness and formulate a new trend in public transport usage. It will change people's perception of public transport [21]. Indeed, individuals, who use public transport, would become more active physically and socially. In other words, they need to walk from their homes to bus stops or stations, have more opportunity to meet new friends and socialize with them [19]. These implications, eventually, would lead to improvements in the mental and physical health of the citizens of Almaty city.

Secondly, it cannot be denied that plantations may considerably improve the air and noise quality of the city. The number of studies shows that a core principle in resolving the sophisticated urban challenges is nature-based solutions, which are

defined as the measures to mitigate air and noise pollution through sustainable usage of landscape in urban areas [5, 6]. This systematic way, which was successfully implemented in different cities of Europe and North America such as Madrid, London, Milan, New York, Paris, offers a variety of innovative solutions to adapt the current urban infrastructure into the sustainable environment through expanding green areas such as orchards and parklands. Increasing the trees along roads and in neighbourhood areas have a tremendous effect on reducing carbon dioxide concentration in air [7]. In Almaty to increase green areas, it is necessary to rebuild the majority of the transport infrastructure, which requires a significant financial investment. However, the river reclamation project in Madrid through reconstruction one of the longest urban tunnel in the world into parklands, promenades and orchards demonstrates the tremendous positive effect of natural-based solutions not only on the ecology of the city but also revenues of the city budget [12]. For instance, the ambient temperature of the area has been lowered to 3 Celcius, new 64 thousand visitors have been attracted per day, the price of the land in this area has been skyrocketed several times. It means that investments on the natural-based projects could increase the attractiveness of the city to tourists, investors, and improve economic potential. Green spaces also help to attract wildlife animals such as birds, bees and increase the biodiversity of the city. The greater diversity may enhance the evolutionary potential of an ecosystem or revitalize damaged air and soil conditions. Another benefit of green spaces is the ability to stop floods. It seems that expanding woodlands and parks may reduce expenditures on the flood management systems and economical impacts of local river floods during the springtimes. Parks and promenades also can expand infrastructure for leisure as playgrounds, footpaths and bike paths. These facilities establish an opportunity to attract more people to different physical activities [13]. As a result, the health conditions of the city-dwellers may improve drastically.

Both of the offered solutions have obvious benefits and drawbacks. As it was analysed the main cause of the environmental issues in Almaty city is pollutions from the motorized vehicles. Subsequently, implementing the sustainable transport policy addresses to tackle the causes of the problem, and may solve the root of the issue. Whereas the nature-based solutions focus on mitigating the effects of the problem [16]. However, it is unlikely that vehicles with internal combustion engines will be completely dislodged by eco-friendly models of transport in the nearest future. Currently, most of buses and coaches in Almaty consume petrol or diesel. The development of sustainable models of transport is more costly for the city government budget [15]. Thus, mitigating the negative impacts of air and noise pollution from cars and other vehicles are one of the integral parts of modern urban policies. Indeed, the most efficient policy in order to tackle urban challenges is the combination of both methods.

Conclusion

In conclusion, the essay has identified the main sources of air and noise pollution in Almaty city as increasing motorized transport and anthropogenic adjustments in the spatial landscape of the city. Using successful experiences of developed cities in synergy may help to formulate an appropriate strategy to tackle emerged issues. However, lack of finance and established behaviour of city-dwellers might cause obstacles in implementing advanced measures. Therefore, as it was proposed in the paper, focusing on long-term goals and making steady changes could bring enormous benefits for the sustainable development of the city.

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[1]М. Айнабеков, [1]Е. Утеулиев, [2]А. Тажиева, [1]С. Нуракыш
[1]«ҚДСЖМ» Қазақстандық медициналық университеті
[2]С.Ж. Асфендияров атындағы Қазақ Ұлттық медицина университеті

АЛМАТЫ ҚАЛАСЫНДАҒЫ АТМОСФЕРАЛЫҚ ЖӘНЕ ДЫБЫС ЛАСТАНУЫНЫҢ ДЕНСАЛЫҚҚА ӘСЕРЛЕРІ ЖӘНЕ ПРОБЛЕМАНЫҢ МҮМКІН БОЛАТЫН ШЕШУ ЖОЛДАРЫ

Түйін: *Ірі қалалардағы денсаулық мәселелері қоршаған ортаның проблемаларымен тікелей байланысты. Алматыда адам денсаулығына нұқсан келтіретін ауа және дыбыс ластану факторлары бар. Еуропа елдерінде тарап келе жатқан табиғатқа негізделген шешімдер сияқты тиісті шараларды енгізу арқылы қала тұрғындарының жағдайларын едәуір жақсартуға болады.*
Түйінді сөздер: *денсаулық сақтау, атмосфера және дыбыс ластануы, табиғатқа негізделген шешімдер*

[1]М. Айнабеков, [1]Е. Утеулиев, [2]А. Тажиева, [1]С. Нуракыш
[1]Казахстанский Медицинский Университет «ВШОЗ»
[2]Казахский Национальный медицинский университет имени С.Д. Асфендиярова

ВЛИЯНИЕ АТМОСФЕРНОГО И ЗВУКОВОГО ЗАГРЯЗНЕНИЯ НА ЗДОРОВЬЕ НАСЕЛЕНИЯ ГОРОДА АЛМАТЫ И ВОЗМОЖНЫЕ ПУТИ РЕШЕНИЯ ПРОБЛЕМЫ

Резюме: *Проблемы со здоровьем в крупных городах напрямую связаны с проблемами окружающей среды. В Алматы существуют факторы воздушного и звукового загрязнения, наносящие ущерб здоровью человека. В европейских странах можно значительно улучшить положение горожан, введя соответствующие меры такие, как решения, основанные на природе будущего.*
Ключевые слова: *здравоохранение, атмосферное и звуковое загрязнение, решения, основанные на природе*