



## ENVIRONMENTAL FACTORS INFLUENCING THE PREVALENCE OF CONGENITAL BIRTH DEFECTS

*Jalilova G.A., Otashexov Z.I., Iskandarova V.V.*

Tashkent Pediatric Medical Institute

### ✓ *Resume*

*Atmospheric air pollution in cities directly depends on the concentration of industrial facilities, specifics of their production, geographical location of one or another area, the intensity of traffic and other factors that determine the duration of the circulation of polluting components. Determination of the relationship between the degree of atmospheric air pollution and children's health, particularly the presence of congenital pathology is one of the main directions in the development of methods to predict the health of children and adolescents and the development of effective preventive measures.*

*Key words: congenital malformations, environmental pollution, industrial emissions.*

## TUG'MA NUQSONLARNING TARQALISHIGA TA'SIR ETUVCHI OMILLAR

*Jalilova G.A., Otashexov Z.I., Iskandarova V.V.*

Toshkent pediatriya tibbiyot institute

### ✓ *Rezyume*

*Shaharlarda atmosfera havosining ifloslanishi bevosita sanoat ob'ektlarining kontsentratsiyasiga, ularni ishlab chiqarishning o'ziga xos xususiyatlariga, u yoki bu hududning geografik joylashuviga, transport harakati intensivligiga va ifloslantiruvchi komponentlarning aylanish muddatini belgilovchi boshqa omillarga bog'liq. Atmosfera havosining ifloslanish darajasi va bolalar salomatligi o'rtasidagi bog'liqlikni aniqlash, xususan, tug'ma patologiyaning mavjudligi bolalar va o'smirlar salomatligini bashorat qilish va samarali profilaktika choralari ishlab chiqishning asosiy yo'nalishlaridan biridir.*

*Kalit so'zlar: tug'ma nuqsonlar, atrof-muhitning ifloslanishi, sanoat chiqindilari.*

## ФАКТОРЫ, ВЛИЯЮЩИЕ НА РАСПРОСТРАНЕННОСТЬ ВРОЖДЕННЫХ АНОМАЛИЙ

*Джалилова Г.А., Оташеков З.И., Искадарова В.В.*

Ташкентский педиатрический медицинский институт

### ✓ *Резюме*

*Загрязнение атмосферного воздуха в городах напрямую зависит от концентрации промышленных объектов, специфики их производства, географического положения той или иной местности, интенсивности движения транспорта и других факторов, определяющих круговорот загрязняющих компонентов. Определение связи между уровнем загрязнения атмосферного воздуха и состоянием здоровья детей, в частности наличием врожденной патологии, является одним из основных направлений в прогнозировании здоровья детей и подростков и разработке эффективных профилактических мероприятий.*

*Ключевые слова: врожденные дефекты, загрязнение окружающей среды, промышленные отходы.*

## Relevance

High pollution of the environment, especially atmospheric air, leads to the fact that in cities, where industrial production is developed, people are constantly exposed to low concentrations of harmful substances from generation to generation, and this, in turn, is one of the factors responsible for the high incidence of various pathologies, including children [1,4].

In the structure of child morbidity in the last 3 years, along with diseases of the respiratory organs, blood and hemopoietic organs, nervous system and sensory organs, the leading place is occupied by congenital anomalies. This is evident from the data of a number of authors who note that in recent years there has been an increase in the number of congenital diseases, metabolic disorders, diseases of the kidneys, nervous system, immunodeficiency disorders and others among the child population of the country, especially in large cities and environmentally disadvantaged regions [2]. In addition to respiratory diseases, infectious diseases and others, congenital abnormalities occupy an important place among the causes of infant mortality in the republic. The leading causes of perinatal mortality in different regions are asphyxia and atelectasis (47.2%-50.0%), birth traumas (17.0%-20.0%), and congenital malformations (12.8%-14.0%) [2,3].

The causes of congenital pathology and mortality are a number of factors, one of which is environmental pollution, especially in industrial cities, but these issues have not been sufficiently studied [4]. In this regard, the study of the prevalence of congenital pathology and the factors influencing its occurrence is an urgent problem.

**The aim of the present study** was to study socio-hygienic factors influencing the prevalence of congenital pathology in children living in small industrial cities of Uzbekistan and to improve measures aimed at its prevention.

In order to achieve the goal, the following tasks were defined: to study the incidence and structure of congenital pathologies among children living in small industrial cities of Uzbekistan and to develop ways to improve measures to prevent congenital pathologies in children.

## Materials and Methods

Our studies on the prevalence of congenital malformations were conducted in small industrial towns of Tashkent province - Angren, Almalyk and Ahangaran, located in the north-east of the Republic of Uzbekistan. These towns were chosen because of the large number of industrial enterprises and harmful substances emitted into the environment, which can be the cause of various developmental abnormalities in children. The city of Almalyk is a large industrial centre with ore enrichment facilities and a mining and smelting plant producing copper and lead. The Almalyk chemical plant produces sulphuric acid using wastes of non-ferrous metallurgy and a large range of fertilizers and pesticides. Industrial emissions into the atmosphere consist of sulphur dioxide and carbon monoxide.

The city of Angren is located in the region of the lignite deposit. There are Angren chemical-metallurgical plant, open and closed coal mines, Angren thermal power plant, and rubber products plant operating in this region. Industrial emissions into the atmosphere consist of sulfur dioxide, nitrogen, hydrocarbons, VOCs, etc. In Akhangaran city, there is a cement plant, a slate plant, a reinforced concrete products plant, a "Stroiplastmass" enterprise, a "Santekhmet" plant, etc. Industrial emissions into the atmosphere consist of hydrocarbons, nitrogen, etc. [4,5]. Thus, all three cities are cities with high environmental pollution by various industrial emissions, affecting the health of the population, particularly mothers and children.

We studied 25,571 medical records by retrospective analysis by way of excerpting data from records of maternity hospitals and outpatient records of children living in Almalyk, Angren, Ahangaran cities. A total of 422 children with congenital malformations were identified.

## Results and discussion

According to Goskomstat data, the prevalence of congenital malformations is increasing from year to year in small industrial cities, which is primarily due to intensive environmental pollution, changes in socio-economic conditions and insufficient knowledge of the population about the causes of congenital pathologies and measures for their prevention. It has been established that the main pollutants of atmospheric air in the studied small industrial cities of Uzbekistan are sulphur dioxide, ammonia vapours and hydrogen fluoride, whose content exceeds the MPC by 1.5-4 times. Ammonium phosphate dust, the concentration of which exceeded the permissible limits by 4-5 times, was also in the emissions of the plants. Annual atmospheric pollution by emissions of ammophos production is 62

thousand 536 tons, of which up to 6 thousand 430 tons are uncollected. The main sources of emission of the named substances into the atmosphere are the drum granulator dryer, collectors, air coolers, high-speed ammoniator, raw and finished product warehouse, as well as the system of labour pipelines [7].

The largest amount of emissions from stationary sources is in Almalyk (about 150 thousand tons), where large enterprises of non-ferrous metallurgy and chemical industry are located, Angren (about 80 thousand tons) - enterprises of the Ministry of Energy, construction materials, petrochemical industry and others. Correspondingly in these towns and cities the birth rate of children with various congenital pathologies is 18.6 and 10.2 respectively per 1000 children born alive.

In terms of nosological forms, all the registered CHDs were distributed as follows: Musculoskeletal system IDD and deformities - 25.0%; congenital heart defects - 22.1%; nervous system IDD - 10.4%; cleft lip and palate - 9.7%; digestive organ IDD - 7.1%; multiple birth defects - 5.7%; genitalia - 5.7%; chromosomal disorders - 2.8%; visual system - 4.2%; hearing system - 1.7%; skin - 1.2%; other - 4.4%. Such severe types of birth defects as Down's disease, microcephaly, hydrocephalus, ear atresia, rectal atresia, external ear fistula were registered less frequently, i.e., one case each was detected during the elapsed period of our study.

Analysis of the prevalence of congenital pathologies in Almalyk city has shown that the prevalence rate of CHD in Almalyk city, in comparison with other compared cities, is at a high level, which in our opinion is due to the presence of a large number of industrial enterprises that pollute the atmosphere. One of the main sources of environmental pollution in Almalyk city is the mining industry which pollutes both the environment and workplaces. In comparison with other regions and the national average, the incidence of congenital pathologies is high in Angren, and it ranks second after Almalyk. The most common birth defects and deformities of the musculoskeletal system (23.6% and 27.8% respectively), cardiac birth defects (22.6% and 19.25% respectively) and neural birth defects (11.6% and 10.26% respectively) in the studied small industrial towns were among both boys and girls.

Among multiple congenital malformations, the most common were a combination of congenital heart defects and neural malformations (24.0%); congenital heart defects and musculoskeletal deformities (16.0%); congenital heart defects and Down's disease (8.0%); cleft lip and palate and musculoskeletal deformities (12.0%); congenital bowel obstruction and other anomalies (16.0%); congenital pathology of musculoskeletal and nervous system (8.0%).

To confirm the influence of the environmental factor on the prevalence of IDPs, we chose the control Bostanlyk district of Tashkent province, where, according to the State Department of Statistics, the levels of sulphur dioxide, nitrogen oxide, carbon monoxide and dust in the air do not exceed the MPC. According to statistical data for the study period in Bostanlyk region the prevalence of CHD was 0.73 per 1,000 children under 14 years of age. The analysis of the data showed that in Bostanlyk district the prevalence of CHD is at a relatively similar level, and in small industrial cities compared to it under the influence of environmental factors there has been an increase in the birth of children with CHD by 1.9 times, which is statistically reliable. The given figures confirm that the factors of production and environmental pollution contribute to the increase in the prevalence of CHD in small industrial cities.

The high concentration of harmful substances in production and the environment in these cities is one of the causes of somatic and gynecological diseases among women, especially those of fertile age, which, in turn, is often the cause of birth of children with CHD. It is known that the health of an unborn child is determined by the nature and state of health of its parents, conditions of intrauterine development of the foetus, microsocial (family) and social environment in which the life of a woman - future mother and child takes place.

The birth of children with congenital abnormalities is a multifaceted problem, and its dimensions are determined both by external environmental conditions and by a number of maternal characteristics affecting the foetus and child during pregnancy. Therefore, continuous monitoring of changes in the birth rate of children with congenital abnormalities is one of the prerequisites for assessing the effectiveness of the health services provided and of the health interventions undertaken among the female population.

## Conclusions

1. The incidence of children with CHD in small industrial cities of the republic is significantly higher than in other regions. In the studied small industrial cities the frequency of occurrence of CHD

compared with other regions under the influence of environmental factors there is a 1.9-fold increase in the birth of children with CHD.

2. The most significant factors influencing the birth of children with CHD are: the combined effect of environmental factors and chemical pollution.

3. On the total impact of various factors as a result of assessing the degree of environmental pollution all studied small industrial cities belong to a zone of intense ecological situation and cause concerns for public health, particularly children, which necessitated the development of measures to reduce congenital pathology.

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