International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 04, 2020
ISSN: 1475-7192

THE PREVALENCE OF SYMPTOMS OF ALLERGIC DISEASESIN CHILDREN RESIDING IN INDUSTRIALREGIONS OF UZBEKISTAN

[1]Jae Wook Choi[A], Barno Turdixodjaevna Khalmatova[B], Feruza Ibodullaevna Salomova[B], Ilmira Sadullaevna Razikova[B], Maktuba Habibullaevna Mirraximova[B], Gulnoza Aloevna Tashmatova[B], Shoira Adhamovna Ibragimova [B], Nishonboyeva Nilufar Yunusjanovna [B]

Abstract---*This article is devoted to such an urgent problem of social medicine as asthma and allergies in children, which has important theoretical and practical significance. The article is based on the results of epidemiological studies performed by a team of authors. The paper summarizes and highlights internationally recognized methods for studying the true prevalence of diseases among the population through questionnaires. Among the modern problems of medicine and health care that attract the attention of researchers around the world, an important place is occupied by allergic diseases: bronchial asthma, allergic rhinitis and atopic dermatitis. The researchers found that the presence of a hereditary predisposition to allergic diseases in the family is a significant risk factor. At the same time, environmental factors also remain important factors in the occurrence and exacerbation of allergic diseases.*

The study, in which visits to the hospital of children with repeated exacerbations of allergic diseases were analyzed, indicates that industrial air pollution, especially near the house where the child lives, affects the clinical manifestations and the severity of the disease. Evaluation of the role of adverse effects on the human body due to environmental pollution is the most important task of medicine and is of great medical and social importance. This task is of particular importance for pediatrics, dealing with a growing organism that is sensitive to any environmental influences.

Key words---*children, ecology, atopy, asthma, prevalence, ISAAC, allergic diseases, prognosis.*

[1A] Korea University
[B] Tashkent Medical Academy
Barno Turdixodjaevna Khalmatova – head of Department of Children's diseases of Tashkent Medical Academy, DSc, professor, e-mail: khalbar@mail.ru
ORCID:0000-0001-6982-1243
Jae Wook Choi - professor of Department of preventive Medicine of Korea University
Feruza Ibodullaevna Salomova - head of Department of Enviromental Hygiene of Tashkent Medical Academy, DSc
Ilmira Sadullaevna Razikova - head of Department of Allergology, clinical Immunology and nursing, DSc, professor
Maktuba Habibullaevna Mirraximova – associate professor of Department of Children's diseases of Tashkent Medical Academy, PhD
Gulnoza Aloevna Toshmatova – assistant of Department of Children's diseases of Tashkent Medical Academy, e-mail tashmatovagulnoza@gmail.com
ORCID: 0000-0002-4384-3767
Shoira Adhamovna Ibragimova assistant of Department of Children's diseases of Tashkent Medical Academy,
Nishonboyeva Nilufar Yunusjanovna assistant of Department of Children's diseases of Tashkent Medical Academy

DOI: 10.37200/IJPR/V24I4/PR201321
Received: 22 Sep 2019 | Revised: 13 Oct 2019 | Accepted: 15 Jan 2020

I. INTRODUCTION

Currently, despite the fact that pediatricians and allergists manage to control the course of atopic pathology (AP) in children and prevent its severe course, the disease is not completely cured, which requires constant monitoring by medical workers, family members and the patient himself. The concept of "recovery" in AP most often should be considered as a long-term clinical remission. The success of the treatment of such children largely depends on the early diagnosis of these diseases and adequate treatment. They lead to physical, psycho-emotional and other restrictions in the daily life of the child, often to disability and mortality.

To solve these issues, it is necessary, first of all, to have real data on the prevalence and frequency of allergic diseases among children. Unfortunately, most often the data of official statistics and real data are not comparable. In general, the prevalence of AP is studied on the basis of the appeal of children and their parents to medical institutions. These data do not correspond to their true prevalence, since the parents of many children with AP do not seek medical help from healthcare institutions for various reasons, or doctors do not diagnose them with allergic diseases, especially in the early stages of the disease and in mild cases. The absence of clear diagnostic criteria and the failure to register the disease also lead to low prevalence rates of AP due to the fear of worsening reporting indicators and the negative attitude of the child's parents towards the diagnosis of chronic disease.

The most reliable and comparable data on the prevalence of AP were obtained in connection with the introduction of a standardized methodology - the ISAAC program (International Study of Asthma and Allergy in Childhood)[5,17,18]. The results obtained by the ISAAC method indicate a significant difference in the prevalence of allergic diseases in children in different countries. For example, in the USA - 21.1%, Norway - 20.8%, Great Britain - 30%, Spain - 6.3%, Russia - 5.3%, Ukraine - 4.7%, Albania - 1%, Iran - 2% [5,11,13,16,19]. To date, studies have not been conducted to identify the prevalence of AP among children living in technogenic zones of Uzbekistan using ISAAC [15].

It is known that the health status of the population, including children, is influenced by climatogeographic, social, endemic and, to a large extent, environmental factors, there is information about the effect of technogenic environmental pollutants on the pathology of the bronchopulmonary system in children [3,10,12,14].

Air pollution is determined by the influx of polluting substances from natural and man-made sources, as well as the physical, geographical and climatic conditions of the territory. A significant part of Uzbekistan is a flat territory belonging to the Turan lowland, open to cold invasions, which forms sharply continental climate features.Here, western, north-western intrusions of moist air from the temperate latitudes of the Atlantic Ocean are periodically observed, which also affects the formation of qualitative and quantitative characteristics of the atmosphere.The main natural pollutants of the plain territory are natural sources of aerosol emissions into the atmosphere, such as the Karakum and Kyzyl Kum deserts with their frequent dust storms, as well as the Aral Sea zone from the shrunken part of the Aral Sea, from the surface of which large masses of saline dust rise and carry from the west to the east .

Sources of anthropogenic pollutants are transport and enterprises of the leading industries of the Republic: oil and gas extraction and processing, energy, metallurgy, construction, chemical and others[2,3]. The contribution of mobile pollution sources, mainly automobiles, to the total air emissions is less than 50% in Kazakhstan and Turkmenistan, up to 70% in Uzbekistan and reaches almost 90% in Tajikistan and Kyrgyzstan. The largest specific emissions of pollutants are in the Tashkent region [3,7].

Meanwhile, in each region there are various technologies and production volumes that are almost unique in types, as well as in terms of technogenic impact on the environment and the human body, which must be taken into account when conducting epidemiological studies and studying the characteristics of the course of diseases [2,3,7].

DOI: 10.37200/IJPR/V24I4/PR201321
Received: 22 Sep 2019 | Revised: 13 Oct 2019 | Accepted: 15 Jan 2020

To date, in the industrial regions of the Tashkent region, epidemiological studies under the ISAAC program have not been conducted, risk factors and features of the course of AP among children have not been studied.

The purpose of the study is to study the dynamics of indicators of the general and primary incidence of allergic pathology among children living in industrial regions of the Tashkent region.

II. MATERIALS AND METHODS

We conducted a survey of 5500 children, aged 7-8 years and 13-14 years old, living in industrial regions of the Tashkent region (Republic of Uzbekistan).The basis for the study in three regions of the Tashkent region was the fact that several industrial facilities are located in these regions.For example, in Almalyk there is a large industrial holding AMSC (Almalyk mining and smelting combine), where zinc is periodically released into the water. In Chirchik, there is a large industrial holding LLC "Uzneftegazmash", which produces technological equipment for the chemical industry, there is periodically released chlorine vapor into the atmosphere.In Angren, there is a branch of the metallurgical industry, where large amounts of aluminum are released into the soil [2]. For comparison, a survey was conducted among children living in an environmentally more favorable region of the Tashkent region (Kibray).

Uz Hydromet has been monitoring air pollution in the cities of the Republic for many years. Observations are conducted in 25 cities and towns. In total, 63 stationary posts operate in the republic. The monitoring program covers 5 main pollutants: dust (suspended solids), carbon monoxide (carbon monoxide), nitrogen dioxide, sulfur dioxide, nitric oxide.Other parameters are added to the measurement programs depending on the composition of industrial emissions and the characteristics of the nearest cities and adjacent territories (ammonia, phenol, formaldehyde, ozone, chlorine, solid fluorides, hydrogen fluorides). Observation of the state of atmospheric air is carried out daily with a frequency of 3 times a day [3,7].

Assessment of air quality in the city is carried out according to the methodology set out in GD 52.04.186-89 (Guidance document. Guidelines for the control of atmospheric pollution), which is the fundamental guide for Hydromet systems in the CIS countries. The number of posts in the city (according to GD) depends on the population in the city, the area of the settlement, the terrain, and the degree of industrialization.The information obtained from 63 stationary observation posts made it possible to judge the average level of atmospheric air pollution in the whole country and calculate the atmospheric pollution index (hereinafter - API), which gives an integral characteristic of the level of air pollution for the city over the year.

The complex atmospheric pollution index (hereinafter – API_5) is calculated for five substances with the highest normalized MPC values taking into account their hazard class. The API calculation does not include ozone values, since observations of this impurity are carried out for an incomplete year and not in all cities, and according to formaldehyde, due to the fact that the method determines the amount of aldehydes (under the definition of "formaldehyde" are given the concentrations of the amounts of aldehydes without comparison MPC).

Air pollution is determined by the concentration of impurities. The degree of pollution is assessed by comparing actual concentrations with hygiene standards - the maximum allowable concentration of impurities in the air. There are 4 gradations of the degree of air pollution: from "low" to "very high" (table 1).

Table 1. Assessment of air pollution

Degrees of air pollution	Index of air pollution	Assessment
Low	API	0-4
Increased	API	5-6

DOI: 10.37200/IJPR/V24I4/PR201321
Received: 22 Sep 2019 | Revised: 13 Oct 2019 | Accepted: 15 Jan 2020

High	API	7-13
Very high	API	14

When planning a study of the prevalence of AP symptoms in the regions of the Tashkent region, it was supposed to obtain confirmation of the true prevalence.

The study of the prevalence of allergic diseases in schoolchildren of the Tashkent region was carried out by a continuous simultaneous study of children:

1. Children living in Angren (aged 7-8 years n = 650, aged 13-14 years n = 850);

2. Children living in the city of Almalyk (at the age of 7-8 years old n = 630, at the age of 13-14 years old n = 880);

3. Children living in the city of Chirchik (at the age of 7-8 years old n = 670, at the age of 13-14 years old n = 820);

4. Children living in the city of Kibray (at the age of 7-8 years old n = 470, at the age of 13-14 years old n = 530);

The study was carried out in two stages: I - the stage included conducting a survey on the adapted and modified international ISAAC questionnaire.

High school students filled out questionnaires on their own, for first graders, parents filled in the questionnaires.

The second stage of the examination (clinical, functional and allergological studies) was conducted for children who gave positive answers to questionnaire questions. Moreover, all children were distributed depending on the nosology: bronchial asthma, atopic dermatitis, allergic rhinitis.

Symptom prevalence - percentage (%) of positively answered ("Yes") children to the questionnaire from the total number of patients examined.

After stage 1 of the study, 1878 children (34.1%) were selected with a large number of positive answers to the questionnaire.

Among them, 919 children (48.9%) with suspected bronchial asthma, 581 children (30.9%) with suspected atopic dermatitis and 378 children (20.1%) with suspected allergic rhinitis.

To identify risk factors and the clinical features of AP in selected children, additional studies were carried out, which included a thorough history and general clinical examination, a study of peak flow metrics, peripheral blood analysis, a study of the level of specific IgE in the blood and determination of the level of leukotriene receptors in the urine.

The content of total IgE (IgE, IU / ml) in the blood serum was determined by the immunochemiluminescent method on a COBAS E 411 instrument (norms for the content of this indicator are from O to 100 IU / ml). Allergen-specific IgE (IU / ml) in blood serum was determined by solid-phase ELISA using C.A.R. reagent kits. L.A. System (Russia). The interpretation of the results is as follows: <0.35 IU / ml - class O (clinically insignificant), 0.36-0.5 IU / ml - class 0-1 (very low), 0.51-1.0 IU / ml - class 1 (low), 1.1-5.0 IU / ml - class 2 (medium), 5.1-25 IU / ml - class 3 (high), 25-75 IU / ml - class 4 (very high) ,> 75 IU / ml - Class 5 (extremely high). A clinical blood test was performed every 14 days during the treatment period.

Method for determination of leukotriene receptors (С4Д4Е4) in urine: The kit is intended for the quantitative determination of C4/D4/E4 leukotrienes in samples of human biological fluids by competitive ELISA. Preliminary preparation: extraction is required depending on the type of sample on the columns and elution of the extracted samples in methanol. Urine samples and tissue culture supernatants can also be analyzed immediately after dilution with extraction buffer without extraction. Additional equipment: nitrogen source, as it is required to dry the eluates after extraction under a gentle stream of nitrogen. Measurement range: 0.04-2 ng / ml. Sensitivity: 0.04 ng / ml.Mechanism: the synthesis of

DOI: 10.37200/IJPR/V24I4/PR201321
Received: 22 Sep 2019 | Revised: 13 Oct 2019 | Accepted: 15 Jan 2020

leukotrienes by human mast cells mainly occurs with immediate hypersensitivity and begins after the antigen binds to IgE fixed on the surface of these cells. The synthesis of leukotrienes is as follows: free arachidonic acid under the action of 5-lipoxygenase (5-lipoxygenase pathway) is converted to LTA4, from which LTB4 is then formed. Upon conjugation of LTB4 with glutathione, LTC4 is formed (present in the medium for 3-5 minutes), then LTC4 is converted to LTD4 (prevails in the next 15 minutes), from which, in turn, LTE4 is formed. Leukotriene C4 (LTC4) is synthesized by both mast cells and polymorphonuclear leukocytes. It prevails among the products of pulmonary mast cells activated by the allergen-IgE complex.

The monoclonal antiserum that is part of the kit recognizes LTC4, LTD4 and LTE4 and binds to them in a dose-dependent manner.

Peak air velocity was measured in the morning - immediately after waking up to inhalation of bronchodilators and in the evening - before bedtime, after their use. The attempt was carried out three times, noting the best indicator.

Fluctuations in the peak air velocity between morning and evening values (%) were calculated by the formula:

$$Daily\ variability\ PEF = \frac{(PEF\ morning - PEF\ evening)}{0{,}5\text{x}\ (PEF\ morning\ +\ PEF\ evening)}\text{x}100\%$$

Statistical processing of the material was carried out using the software package "Statistics 6" on a personal computer.

III. RESULTS AND DISCUSSION

An analysis of the data showed that over the studied period the increase in the atmospheric pollution index was increased in all the studied cities of the Tashkent region, but especially in the city of Angren (table 2). The integrated pollution indicator was 5.12 in 2014, 5.32 in 2016 and 5.30 in 2017, which corresponds to the II degree, characterized by an increased level of atmospheric pollution, which leads to a deterioration in the living conditions of the population.

Table 2.Indicators of the atmospheric pollution index (API) in the cities of the Tashkent region over the past 5 years

Town	API				
	2013	2014	2015	2016	2017
Almalyk	4,05	4,10	4	4,12	4,23
Angren	4,72	5,12	4,71	5,32	5,30
Chirchik	2,69	2,95	3,61	3,61	3,41
Yangiyul	0,54	0,54	0,57	0,43	0,41
Bekabad	2,79	2,88	3,20	3,67	3,92

In other cities of the republic, elevated API was not observed.

The personal data of children with AP was studied depending on the prevalence of the symptoms of the disease: bronchial asthma, allergic rhinitis and atopic dermatitis. The comparison group was children living in the ecologically most favorable region of the Tashkent region (Kibray).

Prior to the epidemiological study in practical healthcare institutions, a diagnosis of AD was made by 1.2% of children aged 7-8 years and 2.6% of children aged 13-14 years. Although, according to the survey during the year preceding the examination, signs of bronchial obstruction were noted in 7.2% of children aged 7-8 years and 9.5% aged 13-14 years.

A study of the history of the children examined showed that wheezing has ever occurred in 16.1% of children 7-8 years old (Table 3). At the age of 13-14 years, this indicator was 1.4 times higher ($p < 0.05$).

DOI: 10.37200/IJPR/V24I4/PR201321
Received: 22 Sep 2019 | Revised: 13 Oct 2019 | Accepted: 15 Jan 2020

Table 3. The prevalence of symptoms of bronchial asthma in schoolchildren according to the survey (%)

Symptoms of the disease	**Schoolchildren**		*Total n=919*
	7-8 years old (n=397)	*13-14 years old (n=522)*	
Symptom Frequency			
Wheezing ever	16,1	22,03	19,5
Wheezing over the past yea	5,58	9,8	7,94
Frequency of wheezing breathing:			
from 1 to 3	3,31*	7,1	5,44
from 4 to 12	0,76	1,5	1,2
more than 12	0,25	0,57	0,44
Sleep disturbance due to wheezing	9,32	2,9	5,65
Presence of wheezing with speech restriction	0,75	0,57	0,65
The presence of shortness of breath during physical exertion	8,1	12,45	10,55
Dry, unbound with a cold cough at night	13,35	12,64	7,39
BA ever diagnosed	1,25	3,06	2,28

*Note for table 1-3. * - p <0.05 when comparing between the first and second groups.*

According to official statistics, the frequency of BA relapse in children did not exceed three exacerbations per year. Moreover, according to the questionnaire, schoolchildren experienced from 4 to 12 attacks of labored wheezing during the year.Monthly and more frequent exacerbations of asthma over the past year were found in 1.25% of children. Nocturnal episodes of bronchial obstruction were 3 times more often recorded in children 7-8 years old than in children 13-14 years old ($p < 0.05$). In addition, in children 7–8 years of age, heavy labored wheezing with speech restriction of 1–2 words between breaths occurred 0.6 times less often than in schoolchildren of 13–14 years old.Monthly and more frequent exacerbations of asthma over the past year were found in 1.25% of children. Nocturnal episodes of bronchial obstruction were 3 times more often recorded in children 7-8 years old than in children 13-14 years old ($p < 0.05$). In addition, in children 7–8 years of age, heavy labored wheezing with speech restriction of 1–2 words between breaths occurred 0.6 times less often than in schoolchildren of 13–14 years old.

Table № 4. The frequency of BA symptoms according to the modified ISAAC questionnaire depending on the region,%

Feature	**Total number of children n = 919**			
	Ангрен n=310	**Алмалык n=305**	**Чирчик (n=304)**	**Кибрай (n=20)**
Wheezing over the past year	11,6	9,9	8,3	1,25

DOI: 10.37200/IJPR/V24I4/PR201321
Received: 22 Sep 2019 | Revised: 13 Oct 2019 | Accepted: 15 Jan 2020

Sleep disturbance due to wheezing	10,5	7,9	5,2	1,8
Presence of wheezing with wheezing	0,96	0,65	0,33	-
The presence of shortness of breath during physical exertion	15,5	12,9	7,0	0,6
Having a dry, non-cold-related cough at night	9,8	9,3	7,8	1,1

AD was detected in 16.7% of children living in Angren, Almalyk and Chirchik (5.54%, 5.52% and 5.52%, respectively). Moreover, AD symptoms were more often recorded in children living in Angren and Almalyk ($p < 0.05$).

A study of these children with suspected atopic dermatitis showed that 5.1% of the patients complained of the appearance of a widespread itchy rash within 12 months. The prevalence of atopic dermatitis on the age of children has been established. Atopic dermatitis was 2.2 times more common in younger students than in older students. At the same time, typical localization of the rash in the popliteal, ulnar folds, on the skin of the ankles, around the neck, eyes and ears was indicated by 4.8% of the respondents, of which 1.1 times more often among younger children than among older students.In 5.5% of children, AD occurred with periods of complete clinical remission, when the rash completely disappeared, and nocturnal awakenings caused by itching were absent. Sleep disturbance due to severe itching was observed less than 1 time per week in 3.0%, and more often 1 time in 1.2% of respondents.

Table №5. The prevalence of symptoms of atopic dermatitis in schoolchildren according to the survey (%)

Symptoms of the disease	**schoolchildren**		*Total n=581*
	7-8 years old (n=345)	*13-14 years old (n=236)*	
The frequency of symptoms of blood pressure (the presence of an itchy rash)			
For 6 months of life	8,9	5,9	7,7
In the last 12 months	6,3	3,3	5,1
Typical rash localization	4,3	5,5	4,8
Complete disappearance of rash over the past 12 months	7,5	2,5	5,5
Night symptoms: (sleep disturbance due to itchy rash)			
less than 1 night a week	3,4	2,5	3,0
1 or more nights a week	2,0	1,6	1,2
Diagnosis of Atopic Dermatitis	4,3	2,9	3,7

* - $p < 0.05$ when comparing between groups.

9.3% of the examined children had a history of AD symptoms. Among them, the largest percentage of children lived in Angren (5.5%) (Table 6). Sleep disturbance due to an itchy rash was indicated by 3.5% of students living in Angren, which is 1.8 times more often than students living in Almalyk and Chirchik ($p < 0.05$). 5.5% of children with atopic dermatitis living in Angren diagnosed with eczema and neurodermatitis when contacting medical institutions. In Almalyk and Chirchik there were fewer such children (1.8 and 5.5 times, respectively).

DOI: 10.37200/IJPR/V24I4/PR201321
Received: 22 Sep 2019 | Revised: 13 Oct 2019 | Accepted: 15 Jan 2020

Table №6. The frequency of symptoms of atopic dermatitis according to the modified ISAAC questionnaire depending on the region, %

Feature	Total number of children n=741			
	Angren n=197	**Almalik n=201**	**Chirchik (n=183)**	**Kibray (n=20)**
Having an itchy rash ever	7,6	6,9	4,3	1,25
The presence of an itchy rash over the past year	4,5	3,9	3,2	1,8
Itching disturbance due to itchy rash	3,5	1,9*	2,1*	0,6
Ever diagnosed atopic dermatitis	5,5	2,9*	1,0*	0,6*

* - p <0.05 when comparing between groups.

The next objective of our study was to identify children with symptoms of allergic rhinitis. The analysis of questionnaires showed that 37.8% of schoolchildren had symptoms of allergic rhinitis in the last year. When answering block questions regarding allergic rhinitis, the prevailing complaints were difficulty in nasal breathing, sneezing, rhinorrhea; signs of concomitant conjunctivitis were observed 2.6 times less often. These symptoms were predominantly year-round in nature with an increase in frequency in the autumn-winter period and were less likely to occur in May – September, the flowering period of plants in the Tashkent region, which does not correspond to published data. It should be noted that the symptoms of rhinitis to one degree or another interfered with the daily life of 204 (53.9%) of the children surveyed. At the same time, when assessing the prevalence of symptoms depending on age, an increase in the frequency of symptoms among older schoolchildren compared to younger ones is noteworthy (Table 7).

Table №7. The prevalence of symptoms of allergic rhinitis in schoolchildren according to a modified questionnaire, (%)

Symptoms of the disease	**schoolchildren**		*Total n=378*
	7-8 years old (n=245)	*13-14 years old (n=133)*	
Frequency of AR symptoms (sneezing, runny nose, or nasal congestion)			
For 6 months of life	32,6	47,3	37,8
In the last 12 months	19,5	35,3	25,1
Symptoms of AR with itchy eyes and lacrimation over the past 12 months	8,5	20,3	12,6
Symptoms of AR that interfere with everyday life			
Little	10,6	24,8	15,6
moderately	8,5	21,8	13,2
strong	6,5	15,7	9,7

DOI: 10.37200/IJPR/V24I4/PR201321
Received: 22 Sep 2019 | Revised: 13 Oct 2019 | Accepted: 15 Jan 2020

AR diagnosis	15,9	14,2	15,3

** - p <0.05 when comparing between groups.*

When studying the prevalence of AR, the presence of sneezing, runny nose, nasal congestion was most often found among children living in Chirchik (37.1%), while in children living in Angren and Almalyk, these symptoms were less common (17.1% and 26.3 % respectively). In our opinion, this fact can be explained by the release of waste into the air. Moreover, in children living in Qibray this indicator was only 2.2%. The existing symptoms had a negative impact on daily life in 10.5% of children living in Angren, 8.5% in Almalyk and 14.2% in Chirchik. According to questionnaires (form 112 / y), children with AR were diagnosed with hay fever, seasonal rhinitis (Angren 13.5%, Almalyk 2.8% and Chirchik 7.6%). In the future, we analyzed the combination of symptoms of various allergic diseases in children living in the Tashkent region (Table 8).

As can be seen from the data in table 8, the most common combination of symptoms of bronchial asthma and allergic rhinitis is 35 (1.8%), while significantly more often among younger students. The least common combination of symptoms of atopic dermatitis and allergic rhinitis was 8 (0.4%), in primary school children this indicator was 0.6% (p <0.05), while in older students - 0.2%.

Table №8. The combination of symptoms of allergic diseases in the examined schoolchildren (%)

	schoolchildren		
	7-8 years old (n=888)	*13-14 years old (n=990)*	*Total n=1878*
The combination of symptoms of BA and AR	2,3	1,4	1,8
The combination of symptoms of BA and AD	1,3	0,6	0,9
The combination of symptoms of BA, AR and AD	1,01	0,7	0,8
The combination of symptoms of AR and AD	0,6	0,2	0,4

Despite the relatively high specificity and sensitivity of each issue, the final diagnosis requires an in-depth clinical, functional and allergological examination based on generally accepted clinical recommendations.

At the second stage of the study, a comprehensive clinical-laboratory and allergic-immunological examination was carried out in children selected as a result of the survey (n = 450).

A survey of schoolchildren, including the study of IgE content as the main marker of the atopic constitution, showed that its average level was 304.32 ± 14.53 IU / ml. In schoolchildren with BA symptoms, there was a significant difference in IgE level between first-graders and eighth-graders (315.61 ± 42.69 IU / ml (n = 290) and 287.59 ± 30.21 IU / ml (n = 160), p = 0, 58) not installed. Similar results were obtained in children with symptoms of AR and AD. In these groups, the level of IgE in younger schoolchildren was significantly higher (386.53 ± 48.34 IU / ml (n = 39) and 297.39 ± 27.23 IU / ml (n = 40) than in adolescents (198, 67 ± 42.79 IU / ml (n = 41) and 167.59 ± 27.42 IU / ml (n = 32): p = 0.01 and p = 0.02 for AR and AD, respectively.

In accordance with the purpose of our work, we conducted a study of the level of C4D4E4 leukotriene's in urine in children with AP (table 9).

DOI: 10.37200/IJPR/V24I4/PR201321
Received: 22 Sep 2019 | Revised: 13 Oct 2019 | Accepted: 15 Jan 2020

Table №9. The value of leukotriene in patients with various forms of allergic diseases

C4D4E4, ng/ml	
BA(n=30)	3,06±0,018**
AD(n=30)	2,0±0,14**
AR(n=20)	1,9±0,14**
Control group (n=20)	0,54±0,05

*Notes: ** - p <0.05, the significance of differences between the BA, AD, AR groups and the control group.*

A comparative analysis of the initial data revealed a significant increase in LT release in 72 (78.3%) patients with BA more than 5 times compared with the permissible norm (p <0.05). 70.1% of patients with AD and 69.8% of patients with AR also showed an increase in the level of LT. An increase in the level of cystenyl LT is evidence of the leukotriene mechanism in the observed patients, determining the specific clinical phenotype of both BA, AD, and AR and their possible combination. According to our data, LTs can serve as an additional biochemical marker in patients with AP. Based on this, when choosing a method of therapy, it is necessary to take into account the participation of the leukotriene mechanism in AP.

PEF indicators in children with BA initially amounted to more than 17.21 ± 0.67% of the proper values.

IV. CONCLUSIONS

The sanitary state of the air environment in the populated areas of the Tashkent region, it should be noted that, despite the decrease in gross emissions of pollutants, it is not accompanied by stabilization and even better air quality.

The prevalence of AP among schoolchildren living in the Tashkent region is 2.2 times higher than official statistics. According to the questionnaire, the frequency of AD among schoolchildren aged 7-14 was 16.7%, atopic dermatitis 10.6% and allergic rhinitis - 6.9%.

Depending on the region where the children live, the prevalence of AP has differences: in Angren, bronchial asthma is more often detected, in Almalyk atopic dermatitis, Chirchik allergic rhinitis.

LT can serve as an additional biochemical marker in patients with AP; when choosing a method of therapy, the participation of the leukotriene mechanism in AP must be taken into account.

Conducting a questionnaire on a modified ISAAC questionnaire will help identify the true prevalence of allergic pathology among children living in industrialized areas.

Early diagnosis and timely treatment of allergic pathology will help prevent severe forms of the disease and disability from childhood.

REFERENCES

[1] Bogova A. V., Il'ina N. I., Luss L. V. Tendentsii v izucheniiepidemiologiiallergicheskikhzabolevaniy v Rossii za posledniye 10 let //Rossiyskiyallergologicheskiyzhurnal. – 2008. – T. 6. – S. 3-14.
[2] DannyyeGosudarstvennogokomitetaRUz po ekologiiiokhraneokruzhayushcheysredy [Elektronnyyresurs]. – Rezhimdostupa: http://www.uznature.uz/. – Data dostupa: 10.07.2018.
[3] DannyyetsentragidrometeorologicheskoysluzhbypriMinisterstve po chrezvychaynymsituatsiyamRespubliki Uzbekistan (Uzgidromet) po monitoringukachestvavozdukha [Elektronnyyresurs]. – Rezhimdostupa: http://www.meteo.uz/. – Data dostupa: 10.07.2018.
[4] KamaltynovaYe.M. Rasprostranennost' allergicheskikhbolezneyimarkerovsensibilizatsii u deteyshkol'nogovozrasta g. TomskaiTomskoyoblasti po rezul'tatamprogrammy

DOI: 10.37200/IJPR/V24I4/PR201321
Received: 22 Sep 2019 | Revised: 13 Oct 2019 | Accepted: 15 Jan 2020

«Mezhdunarodnoyeissledovaniyeastmyiallergii u detey» (International Study of asthma and Allergy in Childhood) //Ekonomikaiupravleniye v zdravookhranenii. Byulleten' sibirskoymeditsiny, № 3, 2012 str.146-153.

[5] Ognev V. A. Epidemiologiyaastmyiallergii u detey. Po materialammezhdunarodnoyprogrammy po izucheniyuastmyiallergii u detey (International Study of Asthma and Allergies in Childhood (ISAAC)). – 2015.

[6] Smirnova S. V., Taptygina Ye. V., Bronnikova Ye. P. Allergiyaipsevdoallergiya: ekologicheskiyeaspektygeograficheskoypatologii //Ekologiyacheloveka. – 2017. – №. 7.

[7] Sostoyaniyeokruzhayushcheysredy v Tsentral'noyAzii / Regional'nyyekologicheskiytsentrTsentral'noyAzii, Avstriyskoyefederal'noyeagentstvo po okruzhayushcheysrede ; N. Denisov [i dr.]. – Ekologicheskaya set' «Zoy», 2015. – 52 s.

[8] Fed'ko N.A., Dzhanibekova A.S. «Vliyaniyeekologicheskikhfaktorovnaallergicheskuyuzabolevayemost' detskogonaseleniya» //MeditsinskiyvestnikSevernogoKavkaza. God izdaniya: 2014.-N 1.-S.30-32

[9] Cherevatenko A.A.. "Ekologicheskiyefaktoryriskadlyazdorov'yanaseleniya" Zhurnalfundamental'noymeditsinyibiologii, no. 3, 2018, pp. 39-45.

[10] Ernazarova KH.KH, Adylova Z.U. Rasprostranenost' allergicheskikhzabolevaniy v mire // International scientific review. 2017. №2 (33).Ahmed A., Becker A., Hakim A. Evaluation of Asthma and Allergic Rhinitis among the Children of Iqaluit //Journal of Allergy and Clinical Immunology. – 2019. – Т. 143. – №. 2. – s. AB105.

[11] Alahmadi T. S., Banjari M. A., Alharbi A. S. The prevalence of childhood asthma in Saudi Arabia //International journal of pediatrics & adolescent medicine. – 2019. – Т. 6. – №. 2. – p. 74.

[12] Duda L. et al. COMPARATIVE ANALYSIS OF PREVALENCE OF THE MOST COMMON ALERGY DISEASES IN CHILDREN OF THE KYIV REGION (UKRAINE) //Georgian medical news. – 2019. – №. 291. – p. 53-58.

[13] Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention (GINA). - National Institutes of Health; National Heart, Lung, and Blood Institute [accessed June 8, 2015; updated 2018].

[14] Habibullayevna M. M., Turdihadjayevna K. B., Aloyevna T. G. PREVALENCE OF BRONCHIAL ASTHMA IN CHILDREN OF AN INDUSTRIAL REGION IN THE USBEKISTAN //European science review. – 2018. – №. 9-10-2.

[15] Jung S. et al. Risk Factors and Comorbidities Associated With the Allergic Rhinitis Phenotype in Children According to the ARIA Classification //Allergy, Asthma & Immunology Research. – 2019. – Т. 12.

[16] Kumari V. et al. Bronchial asthma: Prevalence and risk factors among children in urban population from Raipur, Chhattisgarh //Indian Journal of Allergy, Asthma and Immunology. – 2019. – Т. 33. – №. 1. – p. 45.

[17] Murrison L. B. et al. Environmental exposures and mechanisms in allergy and asthma development //The Journal of clinical investigation. – 2019. – Т. 129. – №. 3.

[18] Naidoo S. Environmental control of indoor allergens //Current Allergy & Clinical Immunology. – 2019. – Т. 32. – №. 1. – p. 6-10.

[19] Soto-Martínez M. E. et al. The current prevalence of asthma, allergic rhinitis, and eczema related symptoms in school-aged children in Costa Rica //Journal of Asthma. – 2019. – Т. 56. – №. 4. – p. 360-368.

[20] Wang J. et al. Asthma, allergic rhinitis and eczema among parents of preschool children in relation to climate, and dampness and mold in dwellings in China //Environment international. – 2019. – Т. 130. – p.

[21] Manoj kumar sarangi,sasmita padhi (2015) colon targeted drug delivery system-an approach for treating colonic ailments. Journal of Critical Reviews, 2 (4), 12-18.

[22] Rashki,Z.,&Mahdavi,S.J.S. (2016). Novel Design of Optical Channel Drop Filter Based on Photonic Crystal Ring Resonators. *International Academic Journal of Science and Engineering*, 3(1), 108-117.

[23] Devaarul,S., &Iyapparaja,M. (2018). A Review of Big Data Examination in Medicinal Services and Government. *Bonfring International Journal of Networking Technologies and Applications*, 5(2), 15-17.

[24] Batouli, S.A.H., Sisakhti, M. Investigating a hypothesis on the mechanism of long-term memory storage (2019) NeuroQuantology, 17 (3), pp. 60-79.

[25] Sorli, A. How many models of time do we need in physics? (2019) NeuroQuantology, 17 (1), pp. 10-13

DOI: 10.37200/IJPR/V24I4/PR201321
Received: 22 Sep 2019 | Revised: 13 Oct 2019 | Accepted: 15 Jan 2020