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CHARACTERISTICS OF ALLERGIC PATHOLOGIES PROGRESSION IN YOUNG CHILDREN

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The prevalence of symptoms of atopic pathology (bronchial asthma, allergic rhinitis and atopic dermatitis) in children under the age of five years old living in ecologically unfavorable areas was determined using a questionnaire. The incidence of allergic diseases among children under 5 remains unnoticed by pediatricians and primary medical staff, so there is underdiagnosis of these diseases. Observing the difference between official statistics and expert data points out the necessity for careful research to determine the prevalence of atopic diseases among children under 5 in these regions.

Keywords
young children, allergic diseases, atopic dermatitis, allergic rhinitis, ecology.

Urgency. Allergy symptoms are linked with certain periods of development, in other words there are allergic steps [2,8,10]. It is interesting that, the start of allergic pathology corresponds to the age under 5 [1,6,7,9] . In that age manifestations of allergy effect many organs of a child, causing systemic morphofunctional failure; it also effects pregnancy progression in mothers [3,5,11]. But at the same time in that age it is possible to effect the development of allergy from the prophylactic and therapeutic points of view. Every age period in a child's development has certain stages of reactivity development which are called "atopic steps" or "atopic march" [4,7,12].

Until now there were no scientific researches performed to study the prevalence and characteristics of AD (BA, AR, and AD) among the children under 5 in the industrial districts of the Republic of Uzbekistan. According to official data in these three districts of Tashkent region there are 0.001% children under 5 diagnosed and registered with bronchial asthma.

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The objective. To study charateristics of atopic pathology progression in children under 5 with the help of a questionnaire.

Research methods and materials. We performed a poll among the parents of children under 5. According to the inclusion criteria the study involved children from 2 to 5 years old. The poll was performed in kindergartens, and the questionnaires were filled by parents. The poll enrolled parents of 2300 children.

Results. According to the results of the study parents of 278 children (12%) answered positively to the questions about symptoms of BA. Analysis of the answers (Table 1) showed that, 12% of 278 mothers answered positively to the question about any case of difficult or noisy breathing observed in their child, while 10.9% confirmed that their children had noisy breathing or cough attack within the last 12 months.

Table 1

Prevalence of BA symptoms among the children under 5 according to the results of the poll (%)

Symptoms	Children under 5		
	Boys n=174	Girls n=104	Total n=278
Prevalence of symptoms			
Was there any case when your child had difficult or noisy breathing	7.5	4.5	12.0
Was there any case when your child had noisy breathing or cough attack within the last 12 months	6.6	4.3	10.9
Was your child treated in a clinic with wheezing several times a year	11.4	8.6	10.4
Does your child have sleeping disorders due to dyspnoea	5.2	3.8	9.0
Does your child have speech disorders due to dyspnoea or cough attacks	0.45	0.27	0.95
Does your child have short-breathing, wheezing or intensification of cough after or at the time of playing or emotional states (crying or strong laughing).	5.8	3.67	9.47
Is your child diagnosed with	0.39	0.13	0.52

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bronchial asthma			

*Note: 1–3. * – p< 0.01 when compared between boys and girls.*

The prevalence of whistling breathing attacks was 4 – 12 times in 6.8% of the children with greater frequency among boys, than girls (Figure 1).

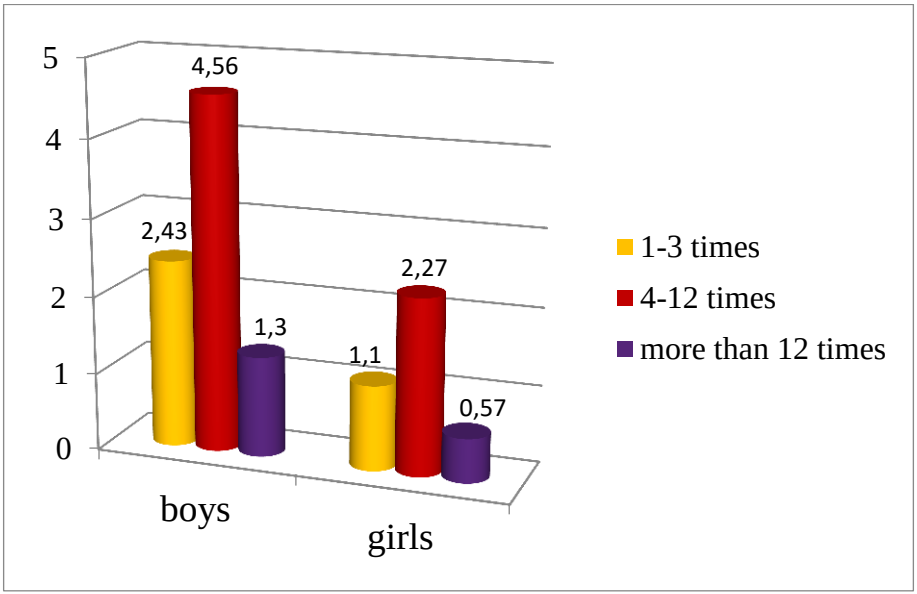

Figure 1. Frequency of whistling breathing attacks within the last year

Results of our study (similar with literature data) showed that, according to the distribution by gender symptoms of BA were observed very often among boys from 2 to 5 years old. For example, sleeping disorders due to dyspnoea (9.0%); speech disorders due to cough attack or dyspnoea; short-breathing, wheezing, and intensification of coughing in emotional states (crying, laughing) or after it (9.47%). According to the literature data, compared to girls respiratory pathways in boys are narrower and shorter, epithelial resistance to viruses is lower with certain hormonal differences. That, in its turn, increases the risk of whistling development after cold or viral diseases [7].

In our study we also paid attention to the prevalence of BA symptoms in children under 5 according to the place of living. These data are presented in Table 2. Comparison of asthma-like symptoms (Table 2) showed high rate of positive answers to questions about noisy breathing or cough attacks within the last 12 months and any case of noisy or difficult breathing among the children under 5 living in Angren than among those living in Olmalik and Chirchik, while the questions about cases of dry coughing not linked with cold and diagnosis of bronchial asthma were positively answered more often by parents of children living in Angren and Olmalik.

Table 2

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Prevalence of BA symptoms among the children under 5 according to the place of living (%)

Symptoms	Total number of children n=278			
	Angren (n=98)	Olmalik (n=91)	Chirchik (n=83)	Kibrai (n=6)
Prevalence				
Was there any case when your child had difficult or noisy breathing	35.2	32.7	29.8	2.15
Was there any case when your child had noisy breathing or cough attack within the last 12 months	34.5	30.1	27.3	1.43
Frequency of whistling breathing attacks: 1 – 3 times 4 – 12 times More than 12	 11.5(32) 20.8(58) 2.9(8)	 10.1(28) 18.3(51) 13.1(12)	 11.1(31) 16.1(45) 8.4(7)	 1.43(4) - -
Sleep disorders due to whistling breathing	19.7	22.3	15.8	0.7
Disorders of speech with dyspnoea and wheezing	7.9	10.1	5.75	-
Does your child have short-breathing, wheezing or intensification of cough after or at the time of playing or emotional states (crying or strong laughing).	23.7	20.8	12.6	1.79
Nighttime dry coughing not relevant to cold	30.2	29.7	23.4	0.7
Was your children diagnosed with bronchial asthma	1.43	1.79	0.7	-

Note: 1–3. compared between the regions – $p < 0.05$.*

The results of the poll of asthma-like symptoms and clinically diagnosed bronchial asthma among the children under 5 obtained with the help of questionnaire confirmed underdiagnosis of the pathology.

Thus, the research we performed in the industrial districts of Tashkent region to study the prevalence of BA among the children under 5 showed underdiagnosis of the disease and higher prevalence rate of coughing type of the pathology among these children. When children under five have 4 or more whistling breathing or dry coughing attacks it is important to assess the probability or risk of bronchial asthma development. When all the other causes of wheezing and dry coughing attacks are excluded there is high probability of correct diagnosis of BA. These patients receive trial therapeutic dose of antiasthmatic agents. If the dose has successful therapeutic

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effect a specialist can answer the question if it is asthma or not. According to the results of our work parents of 202 children (8.7%) answered positively the questions about the symptoms of allergic rhinitis, parents of 287 children (12.4%) noticed the symptoms of atopic dermatitis. Distribution of the symptoms of allergic rhinitis among the children under 5 according to the place of living is presented in Figure 2. From the obtained data we can see that prevalence of allergic rhinitis is the highest (48.5%) in Chirchik region compared to other regions (Olmalik and Angren), and the symptoms were mostly observed among the children of 3-5 years old (67.2) % and more often in boys (61.8%).

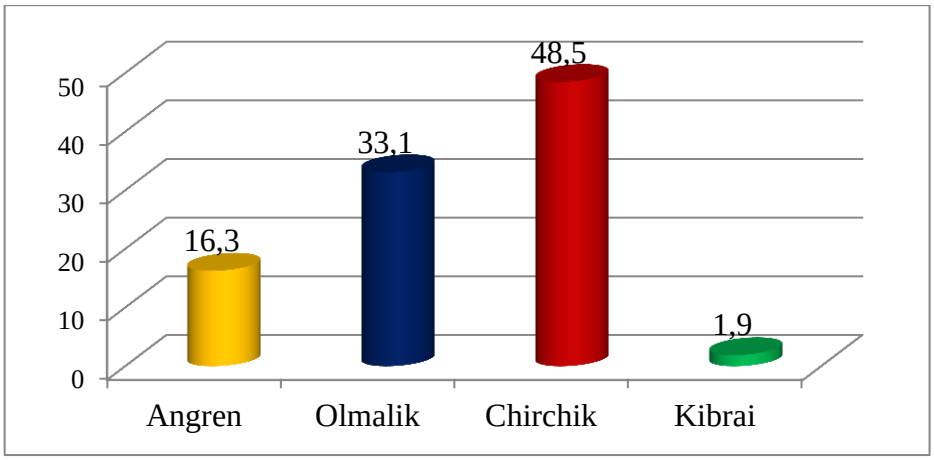

Figure 2. Prevalence of allergic rhinitis symptoms according to the place of living %.

The reason of that is location of Uzoilgasmach Ltd., a large holding manufacturing technologies for chemic industry , in Chirchik where it periodically emits chlorine steam into the atmosphere. The amounts of ammonia and nitrogen registered in Maksam-Chirchik company were 2.6 and 4.7 folds higher than normal limits, respectively.

Table 3

Prevalence of AR symptoms in children under 5 according to the place of living (%)

Symptoms	Total number of children n=202			
	Angren (n=33)	Olmalik (n=67)	Chirchik (n=98)	Kibrai (n=4)
Prevalence				
Does your child have stuffy or itching nose	3.9	9.4	17.3	0.9
Does your child have sneezing or stuffy nose when there is no cold	4.9	8.4	14.3	0.4
Did your child have sneezing or stuffy nose when there is no cold within the last 12 months.	6.4	10.3	20.2	0.4
Does your child have sneezing or stuffy nose,	3.4	7.4	10.8	0.9

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itching in eyes or lacrimation when there is no cold				
Was your child diagnosed with allergic rhinitis	-	0.4	1.4	-
Were there any cases when together with the symptoms of allergic rhinitis your child had itching and rash on skin	2.4	4.4	7.9	-
Were there any cases when symptoms of allergic rhinitis were accompanied by short-breathing, dyspnoea and coughing attack	1.9	2.9	6.4	0.4

Note: 1–3. comparison between the regions – $p < 0.05$.*

The study of the prevalence of AR symptoms in the regions (Table 3) showed that the questions about the cases of sneezing, stuffy nose when there was no cold within the last 12 months and stuffy or itching nose received more positive answers (20.2%, 17.3%) from the mothers of children from Chirchik region.

Significant difference between the defined prevalence of allergic rhinitis symptoms and diagnosis of allergic rhinitis among the children under 5 confirmed the present underdiagnosis of the pathology. The difference between the obtained results can be explained by the similarity of allergic pathological symptoms with the symptoms of other diseases and the fact, that primary line specialist mostly do not take into account immune pathological mechanisms of the disease development.

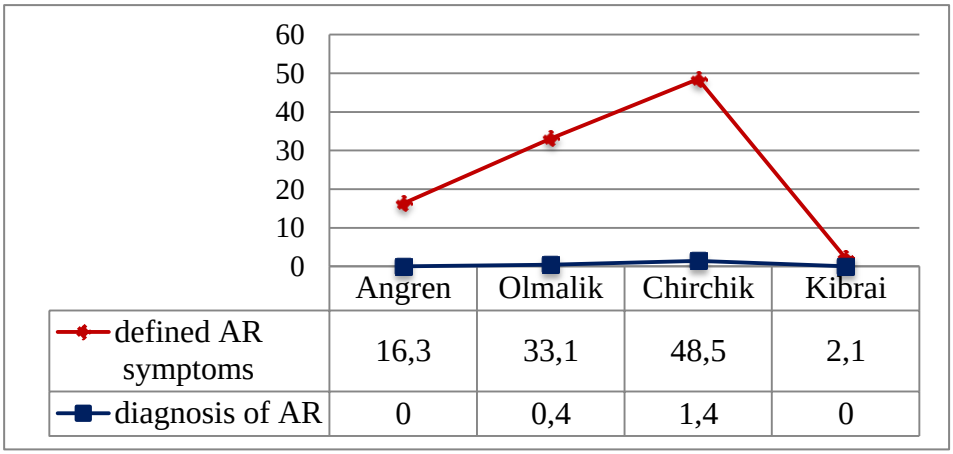

*Figure 3. * comparison between regions – $p < 0.05$.*

The obtained data demonstrate (Figure 4) that when distributed according to the place of living atopic dermatitis is observed in 41.1% of Angren children 30.6% of Olmalik children, and relatively most often in Chirchik with 70% among the children under 3 years old and more often in girls (59.2%).

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Primary sensitivity in atopic dermatitis before 3 years old is sensitivity to food proteins [2]; in our study the symptoms of atopic dermatitis in children under 3 were also caused by food proteins.

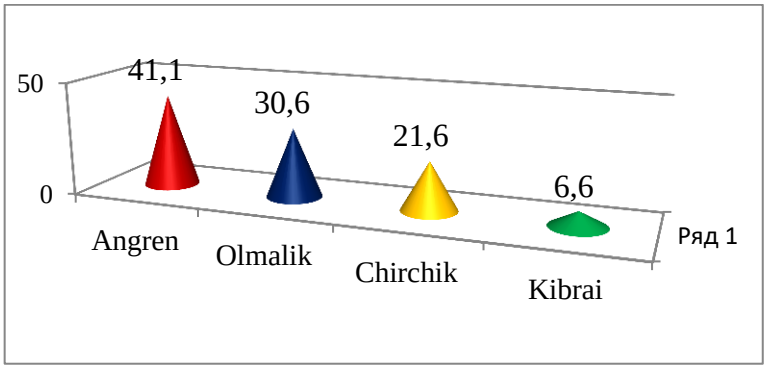

Figure 4. Prevalence of AD symptoms in children according to the place of living %.

The study of medical data of the children supposed to have atopic dermatitis in our research showed (Table 4) that 18.4% of mothers of the children living in Angren answered positively the question about rash appearing after their children consumed red products or much sweets. Some mothers of the children living in ecologically unfavorable regions also answered positively the question about the established diagnosis of atopic dermatitis, urticaria, food allergy, and medication allergy. Moreover, these diagnosis were more often registered in children from Angren (8.3%).

Table 4

Prevalence of AD in children under 5 according to the place of living (%)

Symptoms	Total number of children n=287			
	Angren (n=118)	Olmalik (n=88)	Chirchik (n=62)	Kibrai (n=19)
Prevalence				
Were there any cases of erythema or swelling on your child's skin	16.7	6.6	5.9	1.3
Does your child have rash after eating red products or much sweet	18.4	10.1	5.2	1.7
Was there any case you're your child had rash after administration of some medicine	7.3	4.5	2.4	0.3
Have you ever noticed dryness or peeling on your child's skin	16.0	9.4	4.5	1.0
Did your child have diathesis	10.8	8.0	3.8	0.6
Have your child ever have any erythematic rash or papules 1cm outstanding the surface of skin	6.2	4.1	3.4	0.3

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Was your child diagnosed with atopic dermatitis, urticaria, food allergy, medical allergy	8.3	5.2	3.1	0.6

Note: 1–3. comparison between the regions– $p < 0.05$.*

The reason of that is location of the branch of metallurgic industry in Angren where they a lot of aluminum is emitted to soil. In Kochbulok mine company the registered values of nitrogen ammonia was 9.26 folds, sulfates 2.7 times, and nitrogen nitrites 3 times higher than normal limits. Among the children under 5 allergic rhinitis, atopic dermatitis and its clinical manifestations were registered significantly more often in Kibrai district.

In our study among the children under 3 etiologically significant allergens of atopic dermatitis were: cow milk 72.2%, eggs 41.3%, grains 24.5%, soya 13.4%, fish 9.3%, vegetables and fruit 31.8%. Thirty one (1.3%) children of those under 5 had two and twenty-two (0.9%) had combination of three allergic pathologies.

Conclusion. Thus, among the children under 5 living in ecologically unfavorable districts of Tashkent region prevalence of allergic diseases (bronchial asthma, allergic rhinitis, and atopic dermatitis) and corresponding clinical symptoms was relatively higher in Kibrai districts. Among the children under 5 allergic diseases remain unnoticed by pediatricians and primary line specialists, in other words there is underdiagnosis of these pathologies. These pathologies remain uncovered by allergologist-immunologists, so theey are not included in the corresponding statistical data. It means that, there is no information about the real prevalence of allergic diseases among the children under 5. Consequently there is no in-time adequate pathogenetically-based therapy. The difference between official statistical data and expert results shows the necessity of careful research to study the prevalence of atopic pathologies among the children under 5 in these districts.

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