DOI 10.26724/2079-8334-2021-3-77-7-10
UDC 616-0563-08; 616-022. 8

Ya.J. Abdiyeva
National Center of Ophthalmology named after Academician Zarifa Aliyeva of the Ministry of Health of the Republic of Azerbaijan, Baku

THE PREVALENCE OF ALLERGIC CONJUNCTIVITIS AMONG CHILDREN, DEPENDING ON THE PLACE OF RESIDENCE

e-mail: Statya2021@mail.ru

The study was carried out in the Ganja-Gazakh economic region of Azerbaijan. The total of 2,700 children and adolescents were observed: 300 children (150 boys and 150 girls) in each age group (5–9; 10–14; 15–19) in each type of locality (large city, small towns and rural settlements). The prevalence of allergic conjunctivitis at the age of 5–9 years and adolescents aged 10–14 years (19.4±1.3 % and 17.7±1.3 %) does not significantly differ from each other, but at the age of 15–19 years, this index increases statistically and is 25.8±1.5 %. In the family history of patients with allergic conjunctivitis, this pathology occurs in 42.1±2.1 % of cases in brothers and sisters, in 28.1±1.9 % of cases in mothers, in 22.6±1.8 % of cases in fathers, in 20.9±1.7 % of cases in other relatives. Patients with allergic conjunctivitis have a high relative risk of developing bronchial asthma (by 16.4 times), rhinitis, sinusitis and rhinosinusitis (by 2.4 times), otitis (by 1.8 times) and tonsillitis (by 2.0 times).

Keywords: children, adolescents, allergic conjunctivitis, bronchial asthma, rhinitis

Я.Д. Абдиєва

ПОШИРЕНІСТЬ АЛЕРГІЧНОГО КОН'ЮНКТИВІТУ СЕРЕД ДІТЕЙ В ЗАЛЕЖНОСТІ ВІД МІСЦЯ ПРОЖИВАННЯ

Дослідження проведено в Гянджа-Газахському економічному регіоні Азербайджану. Всього спостерігалося 2700 дітей і підлітків: 300 дітей (150 хлопчиків і 150 дівчаток) в кожній віковій групі (5–9; 10–14; 15–19) в кожному типі населених пунктів (велике місто, малі міста і сільські поселення). Поширеність алергічного кон'юнктивіту у віці 5–9 років і підлітків у віці 10–14 років (19,4±1,3 % і 17,7±1,3 %) достовірно не відрізняються один від одного, але у віці 15–19 років цей показник статистично збільшується і становить 25,8±1,5 %. У сімейному анамнезі хворих алергічним кон'юнктивітом ця патологія зустрічається в 42,1±2,1 % випадків у братів і сестер, в 28,1±1,9 % випадків у матерів, в 22,5±1,8 % випадків у батьків, в 20,9±1,7 % випадків у інших родичів. Пацієнти з алергічним кон'юнктивітом мають високий відносний ризик розвитку бронхіальної астми (у 16,4 раза), риніту, синуситу і риносинусита (в 2,4 рази), отиту (у 1,8 рази) і тонзиліту (в 2,0 рази).

Ключові слова: діти, підлітки, алергічні кон'юнктивіти, бронхіальна астма, риніт.

This work is a fragment of a doctoral dissertation: "The role of eye diseases in the structure of morbidity and disability of the population of the Ganja-Gazakh economic region of the Republic of Azerbaijan and the justification of the regional system of organization of ophthalmological care".

Allergic conjunctivitis is a common pathology all over the world and significantly affects the quality of life of patients [2, 8, 13]. This pathology is dangerous especially for children [7, 9, 11]. Currently, this pathology is an important problem of practical ophthalmology [1, 4] and according to epidemiological studies, their prevalence among the population of developed countries of the world is about 15–20 %. [6, 12, 14]. It has been shown that symptoms such episodes of lacrimation, itching of the eyes bother 40 % of the adult population in the United States of America. The prevalence of such symptoms practically does not change significantly with age. Clinical manifestations of allergic conjunctivitis are caused by hypersensitivity of the body [5, 10]. A more common form of this pathology is seasonal allergic conjunctivitis, which is relatively less disruptive to visual function. Such forms as spring keratoconjunctivitis and atopic keratoconjunctivitis have more serious consequences. Year-round allergic conjunctivitis and giant papillary conjunctivitis also tend to increase among the population. The pathogenesis of this pathology has been studied quite well, the role of numerous environmental factors and genetic predisposition has been proven. In cities, air pollution, pets can be the causes of an increased risk of the prevalence of allergic conjunctivitis. It is known that some professions have a serious harmful effect on vision [10]. Fire service personnel, when performing their duties, face the danger of exposure to smoke, dust, extremely high temperatures (from 1200 ° C to 1400 ° C) and problems associated with personal protective equipment that pose a threat to their eye

health. There are cases of pathology caused by food products. In childhood, allergic conjunctivitis occurs often, with a peak age in late childhood and young adulthood. Patients often have a history of other atopic diseases, such as eczema, asthma or, most often, rhinitis. Symptoms include bilateral lesion, itching, lacrimation, mucous discharge, redness, slight swelling of the eyelids and chemosis. At the same time, there is a risk of vision loss. Allergic conjunctivitis is characterized by a wide variability in the prevalence in different countries of the world, in different regions of the same country [1, 4]. The geographical distribution of conjunctivitis was documented in the global review of the International Study of Asthma and Allergy in Children, where it is noted that Africa, Latin America and Japan are characterized by a high prevalence of this pathology. The regional features of the prevalence of allergic conjunctivitis are relatively poorly studied.

The purpose of the study is to assess the prevalence of allergic conjunctivitis among the children's population, depending on the type of settlements with different environmental situations.

Materials and methods. The study was carried out in the Ganja-Gazakh economic region of Azerbaijan through prospective observation by specialists of the National Center of Ophthalmology named after Academician Z. Alieva as part of a mobile clinic. There is a large city in this region (Ganja with a population of more than 300 thousand), small cities-the centers of administrative districts (Agstafa, Tovuz, Gazakh, Gedabek, Shemkir, Samukh, Gokgel, Geranboy). The majority of the population lives in rural settlements. Children and adolescents (5–19 years old) were selected for observation. The volume of the aggregate in the observations of the age-gender group of children was established (150), taking into account the results with a maximum error of no more than 5 %. A total of 2,700 children and adolescents were examined: 300 children (150 boys and 150 girls) in age groups (5–9; 10–14; 15–19) in each type of settlement (large city, small towns and rural settlements). The data in the outpatient card were studied for each patient, a conversation was carried out to identify the symptoms of allergic rhinitis and conjunctivitis, the program of ophthalmological examination included: the study of visual acuity, light and color vision, the nature of vision, the determination of the pupil's reaction to light; tonometry, ophthalmoscopy, gonioscopy, biomicroscopy, skiascopy and others. According to the indices, a blood test, cytological examination of smears from the conjunctiva, as well as allergological diagnostic tests were carried out. Family predisposition was studied by a survey of parents.

Statistical processing of materials was carried out by methods of analyzing qualitative characteristics using the standard "data analysis" package of the Excel software [3]. The prevalence of allergic conjunctivitis among age–gender groups of children and adolescents was determined by dividing the number of people with these pathologies by the number of people in these groups (the proportion of children with allergic conjunctivitis). The mean error of the fractions was calculated to estimate the 95 % confidence interval. At the same time, the critical value of t was 1.96. The frequency of occurrence of individual signs of allergic conjunctivitis was also calculated for 100 examined patients. Taking into account the fact that each sign occurs once in the patient, this indicator was also expressed as a percentage and their 95 % confidence interval was determined. The statistical significance of the difference between the age and gender groups and the inhabitants of the compared settlements was assessed by the compliance criterion $\chi 2$. The critical value of this criterion was chosen taking into account the degree of freedom [3].

Results of the study and their discussion. The level of prevalence of allergic conjunctivitis among children and adolescents, depending on the age and type of settlements, is shown in table 1. In the general population at the age of 5–9 and 10–14 years, the prevalence of allergic conjunctivitis (19.4±1.3 % and 17.7±1.3 %) does not differ significantly from each other, at the age of 15–19 years, its value increases statistically significantly and is 25.8±1.5 %.The difference between the age groups of children and adolescents in a large city, in small towns and in rural settlements is statistically insignificant, although there is a trend similar to the general population.

Table 1

Age-gender prevalence rates of allergic conjunctivitis among children

Age, years	Large city		Small towns		Small towns		Small towns	
	n	%	n	%	n	%	n	%
5–9	72	24.0±2.5●	61	20.3±2.3●	42	14.0±2.0	175	19.4±1.3
10–14	66	22.0±2.4●	57	19.0±2.3●	36	12.0±1.9	159	17.7±1.3
15–19	100	33.3±2.7●	74	24.7±2.5●	58	19.3±2.3	232	25.8±1.5▲
5–19	238	26.4±1.5●	192	21.3±1.4●	136	15.1±1.2	566	21.0±0.8

Notes: P<0.05 compared to the corresponding groups in rural settlements; P< 0.05 compared to the group aged 5–9 and 10–14 years.

In all age groups of children and adolescents, the prevalence of allergic conjunctivitis is significantly lower in rural settlements compared to large cities and small towns. The 1.9 % in a small city, 13.8±1.6 % in rural settlements) and girls (28.0±3.7 % in a large city, 23.1±2.0 % in a small city, 16.4±1.8 % in rural settlements) did not differ significantly from each other, but the difference in settlements of different types remains reliable. From these data, attention is drawn to the relatively high prevalence of allergic conjunctivitis in groups of girls in large and small cities, as well as in rural settlements. However, a pair comparison of these indicators does not allow us to refute the null hypothesis. In the total population of male and female children and adolescents (19.4±1.1 % and 22.5±1.1 %), the difference in the prevalence of allergic conjunctivitis is statistically significant (P<0.05). In the group of girls, allergic conjunctivitis is significantly more than in the group of boys.

The frequency of occurrence of documented (noted in outpatient records) and identified during the survey of symptoms of allergic conjunctivitis is high. The most common signs were itching in the eyelids and eyes (99.8±0.2 %) and burning in the eyes (90.8±1.2 %). Nasal discharge and photophobia were observed in 51.6±2.1 and 69.6±1.9 % of patients, respectively. Hyperemia and conjunctival edema, as well as lacrimation, were relatively common (86.9±1.4 % and 84.1±1.5 %, respectively). Paroxysmal sneezing was observed in 81.6±1.6 % of sick children and adolescents.

Data on the family history of children with allergic conjunctivitis are given in table 2. In the family history of patients with allergic conjunctivitis in 22.6±1.8 % of cases in fathers, in 28.1±1.9 % of cases in mothers, in 42.1±2.1 % of cases in brothers and sisters, in 20.9±1.7 % of cases in other relatives, the presence of signs of this disease was noted. The proportion of patients in whom both parents suffered from allergic conjunctivitis was 7.4±1.1 %. All family members in 6.4±1.0 % of sick children suffered from allergic conjunctivitis. It should be noted that in groups of children without allergic conjunctivitis, allergic conjunctivitis or rhinitis were not noted in the family history.

Table 2

Family history in children with allergic conjunctivitis

Family history	N	Per 100 patients	95 % confidence interval
The occurrence of allergic conjunctivitis or rhinitis in Fathers	128	22.6±1.8	19.0–26.2
Mothers	159	28.1±1.9	24.3–31.9
Brothers and sisters	238	42.1±2.1	37.9–46.3
Other relatives	118	20.9±1.7	17.5–24.3
Both parents	42	7.4±1.1	5.2–9.6
All family members	36	6.4±1.0	4.4–8.4

The frequency of concomitant pathologies in children with allergic conjunctivitis and without this pathology, respectively, was: 13.1±1.4 and 0.8±0.2 % bronchial asthma, 32.5±2.0 and 13.8±0.2 % rhinitis, sinusitis and rhinosinusitis, 14.3±1.5 and 7.6±0.6 % otitis, 38.0±2.0 and 19.5±0.9 % tonsillitis, 3.2±0.2 and 3.0±0.4 % other pathologies.

From these data, attention is drawn to the statistically significantly high level of bronchial asthma (relative risk 16.4), rhinitis, sinusitis and rhinosinusitis (relative risk 2.4), otitis media (relative risk 1.8) and tonsillitis (relative risk 2.0) in the group of children with allergic conjunctivitis.

According to the literature sources, the prevalence of allergic conjunctivitis varies in the range of 15-40 % [1, 9], according to our data, the indicator value was 21.0±0.8 %. It is obvious that the prevalence of allergic conjunctivitis in our population is in the range of fluctuations of this indicator in other populations. Depending on the place of residence, the incidence of this pathology ranged from 15.1±1.2 % (95 % confidence interval 12.7–17.3 %) to 26.4±1.5 % (95 % confidence interval 23.4–29.4 %). This confirms the role of the place of residence as an external risk factor for allergic conjunctivitis. Compared with urban children, rural children have significantly less allergic conjunctivitis, which may be due to environmental pollution in cities. An increase in the frequency of this pathology at the age of 14 years and older compared with children aged 5-8, 9-12 years was noted in the work [9], our work shows an increase in the risk of allergic conjunctivitis in the age group of 15–19 years. The increase in the prevalence of this pathology in older children was confirmed in other observations [1]. Our data on the gender risk of allergic conjunctivitis correspond to the data of Kumah and co-authors [9].

The manifestation of signs of allergic conjunctivitis in the children we observed mainly corresponds to that in the observations of other authors [1, 8, 9, 11]. The frequency of occurrence of

individual symptoms does not always coincide: photophobia 69.6±1.9 % in our observation, 29.7 % in the observation [9], hyperemia and conjunctival edema 86.9±1.4 and 71.2 %, respectively. In our observation, in 81.6±1.6 % of cases, paroxysmal sneezing was noted, which was noted in the work [9].

The hereditary predisposition to the risk of allergic conjunctivitis is confirmed in the literature[1, 4, 8, 11]. In our study, there are also facts about the role of hereditary predisposition in increasing the risk of allergic conjunctivitis: in the family history of patients with allergic conjunctivitis, in 22.6±1.8% of cases in fathers, in 28.1±1.9 % of cases in mothers, in 42.1±2.1 % of cases in brothers and sisters, in 20.9±1.7 % of cases in other close relatives, the presence of signs of this disease was noted. Particularly noteworthy is the high incidence of allergic conjunctivitis among brothers and sisters, which may be due to both hereditary predisposition and the common living conditions and the surrounding microenvironment. This also applies to the association of comorbidities. We found that children with allergic conjunctivitis were 16.4 times more likely to be diagnosed with bronchial asthma, 2.4 times-rhinitis and sinusitis.

Conclusions

1. The prevalence of allergic conjunctivitis among children and adolescents (5-19 years old) in the Ganja – Gazakh region is 21.0±0.8 %, varies depending on gender in the range from 19.4±1.1 to 22.5±1.1 %, from age from 17.7±1.3 to 25.8±1.5 %, from the type of settlements from 15.1±1.2 to 26.4±1.5 %.

2. In the family history of patients with allergic conjunctivitis, this pathology occurs in 42.1±2.1 % of cases in brothers and sisters, in 28.1±1.9 % of cases in mothers, in 22.6±1.8 % of cases in fathers, in 20.9±1.7 % of cases in other relatives.

3. Patients with allergic conjunctivitis have a high relative risk of bronchial asthma (by 16.4 times), rhinitis, sinusitis and rhinosinusitis (by 2.4 times), otitis media (by 1.8 times) and tonsillitis (by 2.0 times).

References

1. Allergicheskiy rino konjunktivit (klinicheskie rekomendatsii). AS. Lopatin, redaktor. Prakticheskaya meditsina. Moskva. 2015: 96 [in Russian]

2. Gushhin IS, Kurbacheva OM. Allergiya i allergen specificheskaya immunoterapiya. M. Farmarus Print–Media. 2010. 228 s. [in Russian]

3. Stenton G. Mediko–biologicheskaja statistika. Moskva. Izd. Praktika. 1999: 459. [in Russian]

4. Federalnye klinicheskie rekomendatsii po diagnostike i lecheniyu allergicheskogo konjunktivita. Rossiyskaya assotsiatsiya allergologov i klinicheskih immunologov. M. 2013, 16 s.; 414. [in Russian]

5. Chiambaretta F, Gerbaud L, Fauquert JL. Management of allergic conjunctivitis. An observational study among ophthalmologists. J Fr Ophtalmol. 2014 Jan; 37(1):9–17.

6. Fauquert JL. Diagnosing and managing allergic conjunctivitis in childhood: The allergist's perspective . Pediatr Allergy Immunol. 2019 Jun; 30(4):405–414. doi: 10.1111/pai.13035.

7. Geraldini M, Neto HJ, Riedi CA, Rosario N. Conjuctivitis: 359 prevalence of allergic conjunctivitis in childhood. World Allergy Orqan. J. 2012; 5 (2): 132 DOI:10.1097/01.WOX.0000412122.49145.04

8. Gomes PJ. Trends in prevalence and treatment of ocular allergy. Curr. Opin Allergy Clin. Immunol., 2014;14 (5): 451–6;

9. Kumah D.B., Lastey SY., Yemanyi F, Boateng E. Prevalence of allergic conjunctivitis among basic scholl children in the Kumasi Metropolis (Ghana): a community – based cross – study. BMC Ophthalmology, 2015; 15:69 doi:10.1186/s12886-015-0053-8

10. Kumah DB, Onumah B, Asare–Bediako B. Conjunctival Disorders Among Fire Service Personnel in the Kumasi Metropolis, Ghana. M J Opht. 2016; 1(1): 002.

11. La Rosa M., Lionetti E., Reibaldi M, Russo F, Longo A, Leonardi S, et al. Allergic conjunctivitis: a comprehensive review of the literature. Ital J Pediatr. 2013;39:18. doi: 10.1186/1824-7288-39-18.

12. Leonardi A, Piliego F, Castegnaro A, Lazzarini D, Valerio La GA, Mattana P, Fregona I. Allergic conjunctivitis: a cross–sectional study. Clin Exp Allergy. 2015; 45(6):1118–25. doi: 10.1111/cea.12536.

13. Rosario N., Bielory L. Epidemiology of allergic conjunctivitis. Curr. Opin Allergy Clin. Immunol. 2011; 11 (5): 471–6

14. Schröder K, Finis D, Meller S, Buhren BA, Wagenmann M, Geerling G. Seasonal and perennial allergic rhinoconjunctivitis. Klin Monbl Augenheilkd. 2014; 231(5):496–504.

Стаття надійшла 30.07.2020 р.