MANANA KOBAKHIDZE, NINO ADAMIA, MAIA KHERKHEULIDZE, DIMITRI ABELASHVILI, IRINE KEKELIDZE, IRMA UBIRIA, DAREJAN KHACHAPURIDZE, DALI SHOVNADZE

EPIDEMIOLOGICAL CHARACTERISTICS OF IMMUNE-MORPHOLOGICAL CHANGES OF FOOD ALLERGIES, ATOPIC DERMATITIS, ALLERGIC RHINITIS AND BRONCHIAL ASTHMA IN CHILDREN AND ADOLESCENTS

Tbilisi State Medical University, G. Zhvania Pediatric Clinic, M. Iashvili Pediatric Clinic, A. Tsereteli University, National Institute of Allergy, Asthma and Clinical Immunology of the Georgian Academy of Sciences

Doi: https://doi.org/10.52340/jecm.2024.05.01

მანანა კობახიძე, ნინო ადამია, მაია ხერხეულიძე, დიმიტრი აბელაშვილი, ირინე კეკელიძე, ირმა უბირია, დარეჯან ხაჭაპურიძე, დალი შონვაძე

კვებითი ალერგიის, ატოპიური დერმატიტის, ალერგიული რინიტის და ბრონქული ასთმის იმუნო-მორფოლოგიური ცვლილებების ეპიდემიოლოგიური თავისებურებები ბავშვებსა და მოზარდებში

თბილისის სახელმწიფო სამედიცინო უნივერსიტეტი, გ.ჟვანიას პედიატრიული კლინიკა, მ.იაშვილის პედიატრიული კლინიკა, ა.წერეთლის უნივერსიტეტი, საქართველის მეცნიერებათა აკადემიის ალერგიის, ასთმის და კლინიკური იმუნოლოგიის ეროვნული ინსტიტუტი

რეზიუმე

ჩვენი კვლევის მიზანს წარმოადგენდა კვებითი ალერგიის, ატოპიური დერმატიტის, ალერგიული რინიტის და ბრონქული ასთმის ეპიდემიოლოგიური თავისებურებების შესწავლა, ჩვენს კლინიკებში, ამბულატორიულ ვიზიტზე მომართვიანობის მიხედვით ბავშვებსა და მოზრდილ პოპულაციაში. ეპიდემიოლოგიური კვლევის შედეგად ბავშვთა პოპულაციაში ალერგიული დაავადებები: ატოპიური დერმატიტი, საკვებისმიერი ალერგია, ალერგიული რინიტი და ბრონქული ასთმის დიაგნოზი ემყარებოდა დაავადების კლინიკურ სურათს, კლინიკურ კრიტერიუმებს, იმ სიმპტომებს მოცემული პოპულაციის, სადაც პრაქტიკულად არ არსებობს ლაბორატორიული ტესტი, რომელიც დამოუკიდებლად დაადგენს ამ ალერგიული ატოპიის არსებობას. ამრიგად, გაანალიზდა თითოეული ფაქტორის ზემოქმედების მნიშვნელობა და ავადობასთან კავშირი პოპულაციაში. მიღებული მონაცემების მიხედვით მაღალია მართვადი რისკის ფაქტორების ხვედრითი წილი, რაც შეიძლება საფუძვლად დაედოს ალერგიული დაავადებების მიზანმიმართული და ეფექტური პროფილაქტიკური ღონისძიებების შემუშავებას ბავშვთა პოპულაციაში.

Introduction: Allergy and allergic diseases comprise the global problem of the public health care in the world. Among the world population, in the developed industrial countries permanent growth of the incidence of allergic diseases commenced and growth trend became stronger. At current stage, according to the data of World Allergy Organization (WAO), prevalence of allergic diseases all over the world achieve catastrophic scale, not only in the developed but also in the developing countries. Prevalence of allergic diseases achieve 35-40% of entire world population and comprises extremely serious problem. In the children's population allergy prevalence is 15-25% and according to WHO prognosis, 1-2% growth of the allergic pathologies in each following decade should be expected [1,2,3,6,8,14,17].

According to the forecasts of WHO and WAOs, the key expansion reasons of allergies' prevalence would be environment pollution, global warming and increasing migration processes. The great achievements of the last centuries in the molecular and biological immunology contributed to extensive studying of the pathologic physiology mechanisms of the allergic diseases and their development. On one of the relatively well studied allergic diseases (bronchial asthma and allergic rhinitis, pollen disease, atopic dermatitis and food allergies), the document was developed (GINA, ARIA and ISAAC) and this is extremely significant document. Significant steps were made in treatment of atopic dermatitis, seborrheic

dermatitis, contact dermatitis, urticarial, angioedema and psoriasis. Though, in this respect, there still exist numerous problems that are not resolved [4,5,7,9,10,11,12,13,15,16,18].

Growth trend in the prevalence of allergic diseases: food allergies, atopic dermatitis, allergic rhinitis and bronchial asthma, range of its variation in the populations, medical-social significance and impact on the life quality emphasizes significance of population research of this disease in Georgia.

Research goal: studying of epidemiological characteristics of food allergies, atopic dermatitis, allergic rhinitis and bronchial asthma, based on data from our clinics and ambulatory visits, in the populations of children and adolescents.

Research materials and methods: active identification of the symptoms of allergic diseases, i.e. studying of prevalence was provided on the basis of data of 2022-2024, from results of examination of the patients at the clinics and ambulatory visits. On the basis of single-stage epidemiological study, the questionnaire was developed. Specialized questionnaire for expanded study of allergic diseases was developed. There were tested the diagnostic criteria of the allergic diseases: food allergies, atopic dermatitis, allergic rhinitis and bronchial asthma, according to GINA, ARIA and ISAAC, with due regard of classification provided by LORIA. Representative research group was selected of the residents of Tbilisi, Kutaisi and surrounding area and included 1689 children aged from 4-6 months to 17 years, including 746 girls and 943 boys. At the first epidemiological phase of the research the questioning was conducted, the questionnaires were completed directly in the course of conversation with the parents. The questionnaire was oriented to identification of the symptoms of allergic diseases (food allergies, atopic dermatitis, allergic rhinitis, asthma) – their primary diagnostics. Clinical verification of the diagnosis was provided based on GINA, ARIA, ISAAC and LORIA diagnostic criteria. At the second phase, based on the specialized extended map of allergic diseases, there were questioned the respondents who has positively answered to the questions about the symptoms of allergic diseases “ever”. Clinical allergologic study was conducted with the population (923 patients), who has indicated the symptoms of allergic diseases for last 20 months.

For the purpose of specific diagnostics, allergic skin samples were taken from the certain part of the patients, using ALK scherax standard set. The standard set included tests for allergy on food, vegetation, medicines, epidermal and domestic allergens. And in part of the patients IgE level was measured by immune-enzyme method. Thus, in the population of children from Tbilisi, Kutaisi and surrounding areas. Epidemiological study of the allergic diseases was conducted in compliance with the principles of clinical epidemiology and it was based on the following materials: results of screening (888) of the children’s representative population (1689 children); results of the children’s clinical-allergologic study; mathematical analysis of the research results was provided using Microsoft Excel 2010 and SPSS/V16.5 software package and $p<0.05$ was accepted as critical value of reliability.

Obtained results and discussion: age gradation of the studied population included four groups: first group included children aged from 4 months to 4 years; second group included children from 4 to 8 years; third group included children aged from 8 to 12 years; and the fourth group included children aged from 12 to 17 years. According to the results of questioning, for 29 months, the episodes of itching was indicated in 1.8% of the first group of the studied population, 7.9% of the second group, 8.9% in the third group and 14.8% in the fourth group, it was not indicated in 66.6% of the questioned population. Rhinorrhea was indicated in 2.8% of the first group children; 11.5% in the second group; 18.4% in the third group; and 14.7% in the fourth group, in 52.6% of them this symptom was not indicated, where reliable was $p>0.5$. Food allergy to different foods was indicated in 4.2% of the entire population. Prevalence of atopic dermatitis was highest in the first group population – 6% and in the other groups – II – 1.4%; III – 0.7%, IV – 0.5%, with $p>0.5$ reliability.

Episodes of wheezing was indicated in 0.8% of the first group; 2.7% - second group; 1.9% - third group' and 3.4% - fourth group (where number of boys was higher (2.2%), compared with the girls (2.2%) and 2.9% of the population consumed tobacco). 91.2% of the population had no wheezing symptoms. Sleep disorders were indicated in 9.7% of the total population. Irritation was indicated in 3.5% of the population. Presence of infection rush was stated in 8.4% of cases, most apparent in the first group, in 3.7% of cases (II – 1.2%, III – 1.8%, IV – 1.7%) and in 91.6% of the population this symptom was not indicated, with $p>0.5$ reliability. Frequent respiratory infections were indicated in 16.9% of the population. 41.5% of the surveyed children indicated that the symptoms negatively impact their everyday life and activities. Less extensive discomfort was indicated in 58.5% of the respondents.

As for the symptoms of allergic rhinitis, survey results showed that for 20 months of study, recurrent sneezing episodes were indicated in 16.8% of the population, nose itching – 19.6% of the population, rhinorrhea in 18.9%, nose obstruction – 13.8%, lacrimation and eyes itching – 5.7%. Allergic rhinitis was diagnosed in 19.3% of the children's population. High percentage of late diagnostics ($P<0.001$) and prevalence of the mild and average intermittent allergic rhinitis was established. As for presence of bronchial asthma, according to the survey, it was initially diagnosed in 3.8% of the children's population, with $p<0.5$ reliability. According to the obtained data, it is clear that development of allergic rhinitis and bronchial asthma heavily depends on the season, presence of the animals (dogs: 6.5%; cats: 1.8%) in the place of residence, history of allergic response, dust collectors in the place of residence, family history and male gender.

At the next phase of epidemiological study the etiological structure of allergic diseases was studied. The study was conducted on the randomly selected group of the identified patients, including 456 individuals. Range of conducted studies and number of patients (IgE test was conducted on 228 children and skin sample was taken from 228 children). According to the history data, in pathogenesis of the disease, IgE is attributed quite complicated and significant, in 81.3% of individuals with this pathology its level is increased in the blood serum, and in case of identification of the specific allergen, specific IgE antibodies against such allergen should be always sought in the blood serum ($p<0.05$).

On the basis of prick testing prevalence was measured (61.2% $p<0.05$) for the food allergy, sensitization (21.3%, $p<0.05$), allergic eosinophil esophagitis in the elder children's population.

Conclusion: epidemiological study showed that in the children's population, the allergic diseases: atopic dermatitis, food allergies, allergic rhinitis and bronchial asthma, diagnosis was based on the clinical pattern of the disease, clinical criteria, the symptoms in the given population, where there actually is no laboratory test that could establish presence of such allergic atopy. Thus, significance of the impact of each factor and correlation with morbidity in the population was analyzed. According to the obtained data, the share of the manageable risk factors is quite high and this could provide basis for development of the targeted and effective prevention measures for the children's population.

References:

1. Sarah Wise, Lauren Roland, Cecelia Damask, Joshua Levy. Allergy, Asthma, and Immunology Committee, International Consensus Statement on Allergy and Rhinology: Allergic Rhinitis 2023
2. Wise SK, Damask C, Roland LT, Ebert C, Levy JM, et al. International consensus statement on allergy and rhinology: Allergic rhinitis - 2023. Int Forum Allergy Rhinol. 2023 Apr;13(4):293-859.
3. Wise SK, Damask C, et al. A Synopsis of Guidance for Allergic Rhinitis Diagnosis and Management From ICAR 2023. J Allergy Clin Immunol Pract. 2023 Mar;11(3):773-796.
4. Wise SK, Lin SY, Toskala E, Orlandi RR, Akdis CA, et al. International Consensus Statement on Allergy and Rhinology: Allergic Rhinitis. Int Forum Allergy Rhinol. 2018 Feb;8(2):108-352.
5. Dr Sandarva Giri. Allergic rhinitis. First published online November 11, 2023.

6. Alromaih S, Alsagaf L, Aloraini N, et al. (2022) Drug-induced rhinitis: Narrative review. Ear, Nose & Throat Journal 15: 014556132211412
7. P Demoly, J Bousquet, J C Manderscheid, S Dreborg, H Dhivert, F B Michel Precision of skin prick and puncture tests with nine methods, J Allergy Clin Immunol. 1991 Nov;88(5):758-62.
8. 2024 GINA MAIN REPORT
9. Niki Papapostolou, Paraskevi Xepapadaki, et al. Atopic Dermatitis and Food Allergy: A Complex Interplay What We Know and What We Would Like to Learn. online 2022 Jul 21.
10. Hay R.J., Johns N.E., et al. The Global Burden of Skin Disease in 2010: An Analysis of the Prevalence and Impact of Skin Conditions. J. Investig. Dermatol. 2014;134:1527–1534. doi: 10.1038/jid.2013.446
11. Langan S.M., Irvine A.D., Weidinger S. Atopic dermatitis. Lancet. 2020;
12. Prescott S., Allen K.J. Food allergy: Riding the second wave of the allergy epidemic. Pediatric Allergy Immunol. 2011;
13. Giannetti A., Cipriani F., Indio V., Gallucci M., Caffarelli C., Ricci G. Influence of Atopic Dermatitis on Cow's Milk Allergy in Children. Medicina. 2019.
14. C Bunnag, P Jareoncharsri, et al. Epidemiology and current status of allergic rhinitis and asthma in Thailand - ARIA Asia-Pacific Workshop report J Allergy Immunol 2009.
15. Puspalal Katel, Bannapuch Pinkaew, Kanokporn Talek, Pongsakorn Tantilipikorn Pattern of Aeroallergen Sensitization and Quality of Life in Adult Thai Patients With Allergic Rhinitis Front Allergy 2021 Nov 15:2:695055. doi: 10.3389/falgy.2021.695055. eCollection 2021
16. Nualanong Visitsunthorn, Wanwipa Chaimongkol, et al. Great flood and aeroallergen sensitization in children with asthma and/or allergic rhinitis, J Allergy Immunol 2018 Jun.
17. Dane Ediger, Fatma Esra Günaydin, Müge Erbay, Ümmühan Şeker. Trends of sensitization to aeroallergens in patients with allergic rhinitis and asthma in the city of Bursa, South Marmara Sea Region of Turkey. Turk J Med Sci 2020 Apr 9;
18. Stefania Arasi, Ulugbek Nurmatov, Audrey Dunn-Galvin, Graham Roberts, Paul J Turner, Sayantani B Shinder, Ruchi Gupta, WAO consensus on Definition of Food Allergy Severity (DEFASE) World Allergy Organ J 2023 Mar 2;16(3):100753. doi: 10.1016/j.waojou.2023.100753. eCollection 2023 Mar.

MANANA KOBAKHIDZE, NINO ADAMIA, MAIA KHERKHEULIDZE, DIMITRI ABELASHVILI, IRINE KEKELIDZE, IRMA UBIRIA, DAREJAN KHACHAPURIDZE, DALI SHOVNADZE

EPIDEMIOLOGICAL CHARACTERISTICS OF IMMUNE-MORPHOLOGICAL CHANGES OF FOOD ALLERGIES, ATOPIC DERMATITIS, ALLERGIC RHINITIS AND BRONCHIAL ASTHMA IN CHILDREN AND ADOLESCENTS

Tbilisi State Medical University, G. Zhvania Pediatric Clinic, M. Iashvili Pediatric Clinic, A. Tsereteli University, National Institute of Allergy, Asthma and Clinical Immunology of the Georgian Academy of Sciences

SUMMARY

Goal of our research is studying of epidemiological characteristics of food allergies, atopic dermatitis, allergic rhinitis and bronchial asthma, based on data from our clinics and ambulatory visits, in the populations of children and adolescents as a result of epidemiological study, in the children's population, diagnosis of the allergic diseases: atopic dermatitis, food allergies, allergic rhinitis and bronchial asthma, was based on the clinical pattern of the disease, clinical criteria, the symptoms in the population, where there are actually no laboratory tests that could independently establish presence of such allergic atopy.

Thus, we have analyzed significance and correlation of each factor with the morbidity in the population. Based on the obtained data, there is significant share of the manageable risk factors and this could provide basis for development of the targeted and effective prevention measures for the children's population.

Keywords: food allergy, atopic dermatitis, rhinitis, bronchial asthma, epidemiology, immunology