

TIME COURSE OF SYMPTOMATIC MANIFESTATIONS IN CHILDREN WITH BRONCHIAL ASTHMA RESIDING IN KHARKIV REGION ACCORDING TO THE ISAAC STUDY

Klymenko V. A., Karpushenko Y. V., Kozhyna O. S.

Kharkiv National Medical University, Kharkiv, Ukraine

Abstract. For the first time in Ukraine phase IV of the International ISAAC program was realized in Kharkiv Region in 2015–2017. 6330 of questionnaires were distributed. 6146 (97%) of schoolchildren took part in the program. 12.8% of them had respiratory complaints, 13.2% of children at the age from 6 to 7 years, 12.4% of children aged from 13 to 14 years old. A low level of asthma diagnosis in the region was observed. Only 0.5% of children in population were diagnosed with asthma. These results were compared with the data from phase I of ISAAC (V.A. Ognev, 1998) to determine the time course of respiratory symptoms incidence: over the last 19 years the prevalence of respiratory symptoms has decreased by 1.6 times in children of junior school age and by 2 times in adolescents. Significant fluctuations in wheezing prevalence in different districts of Kharkiv Region were revealed: from 5.5% (Barvinkivs'kyi District) to 14% (Derhachivs'kyi District). The study is aimed to improve early diagnosis of asthma in children.

Keywords: *children, bronchial asthma, prevalence, Kharkiv region, ISAAC.*

Introduction. Bronchial asthma (BA) is a chronic heterogeneous inflammatory disease manifesting by respiratory symptoms [1]. The problem of BA is important because of impossibility of complete cure. This significantly reduces the patients' quality of life and is followed by considerable economic costs both for family and society [2]. Despite significant progress in the disease treatment asthma is still one of the frequent reasons of invalidity in pediatrics [3].

According to official statistics BA is the most common chronic disease within pediatric population in different countries of the world [4] but even these high official data do not reflect the true scales of the problem. In order to improve the quality of epidemiological studies of allergic diseases and develop diagnosis on early stages of diseases the international ISAAC (International Study of Asthma and Allergy in Childhood) program, containing IV phases [5], has been realized since 1991 upon the recommendation of WHO.

Corresponding Author:

Viktoriya Klymenko, MD, PhD, professor.

Head of the Department of Fundamentals
of Pediatrics No.2.

Kharkiv National Medical University, Ukraine.

E-mail: klymenkoviktoriiia@gmail.com

Thanks to international cooperation and accomplishing the tasks assigned for each stage, according to a standardized method the prevalence and severity of the respiratory symptoms of asthma in children in different regions of the world were determined and compared. During phase II of the program objective markers of allergy (IgE, skin-prick test, bronchial hyperreactivity, etc.) were studied, their connection with leading clinical symptoms were set, risk factors were analyzed, algorithms of disease treatment in different regions of the world were compared. Phase III of ISAAC was objected to reveal dynamics of prevalence and severity of allergic diseases over long time periods (more than five years) and compare obtained data in research centers. Currently phase IV of ISAAC is being realized in many countries. It involves development and expansion of the ISAAC scope of application, the use of all resources to determine etiological and pathogenic mechanisms of BA in order to reduce the prevalence and severity of the disease [5].

The ISAAC program involves research centers in 105 countries of the world and approximately 2 millions of children have already taken part in it. In Ukraine for the first time in 1997 the research center of the international ISAAC program was founded under the guidance

3. To analyze the prevalence of BA symptomatic manifestations in different districts of Kharkiv Region.

2.2. Subjects & Methods

In order to obtain accurate results on BA prevalence among children of Kharkiv Region the sampling amount was calculated by the formula of Lisitsin Y.P., 1987 [6] taking into account the number of pediatric population and BA prevalence.

After authorization from the official representative of Global Asthma Network organization, within the sphere of which the international ISAAC program is currently implemented, standardized questionnaires for children aged from 6 to 7 years old and from 13 to 14 years old were distributed. Schoolchildren and their parents had to fill in the questionnaire with passport data and answer 8 questions of a "closed" type about respiratory complaints.

To determine dynamics of prevalence of BA respiratory symptoms in children of Kharkiv Region, a comparison with the results of phase I of the ISAAC study implemented in 1998–1999 by Professor Ognev V.A. was made.

To estimate etiological and pathogenetic factors of BA prevalence of respiratory complaints frequency was compared in 8 districts of Kharkiv Region (Lozivs'kyi, Kupyans'kyi, Vovchans'kyi, Bohodukhivs'kyi, Sakhnovshchyns'kyi, Barvinkivs'kyi, Derhachivs'kyi, Novovodolaz'kyi), which differ both in geographic location and environmental characteristics.

The study was realized in compliance with human rights, corresponding to the current legislation of Ukraine. It meets the international ethical requirements and does not violate any ethical norms in science and standards of conducting biomedical research.

The obtained data were stored in the SQLite/MySQL database, the calculation was conducted by variation statistics method.

Conflict of interests

There is no conflict of interests.

3. RESULTS AND DISCUSSION

By means of the sampling method 6330 pupils of schools in districts of Kharkiv Region were questioned using the standardized questionnaires of ISAAC in 2016–17 school years. 184 schoolchildren and their parents refused to take part in the questioning which amounted to 3% of respondents.

Among 6146 children of Kharkiv Region questioned respiratory complaints were revealed in 792 schoolchildren which amounted to 12.8%;

in the age group of 6–7 years old positive answers were given by 13.2% of children, in adolescent group of 13–14 years old 12.4% of answers were positive. The answers to all 8 questions of the questionnaire are represented in *Table 1*.

Assessment of the answers for the ISAAC questionnaire received from the children residing in Kharkiv Region showed that almost every tenth child had a wheezing episode in past medical history. More often it happened at junior school age (10.3%), less often in pubertal period (9.7%). Most of the respiratory symptoms manifestations were not severe, as shown by the low percentage of patients with frequent awakenings at nights (question 4), absence of speech pathologies during BA exacerbations (question 5) and good physical activity tolerance in most patients (question 8).

What stands out is the extremely low percent of asthma diagnosis in the region (the average value is 0.5%, but among children of junior school age it equals to 0.3%). This fact is in contrary with the high prevalence of pathognomonic symptoms and epidemiological studies of Professor V.A. Ognev. This is another argument for intensifying efforts to improve the early diagnosis of BA in the region.

Comparison of the obtained results with the data of phase I of the ISAAC study (1998) has revealed the prevalence of BA symptomatic manifestations decrease in 1.6 times in children aged from 6 to 7 years old and in 2 times in adolescent group [5].

While comparing the prevalence of symptomatic manifestations of BA in Kharkiv Region and other regions of the world it should be mentioned that our data are higher than the ones in Africa and Indian Region, lower than in North and Latin America, Oceania and equal to the prevalence in Asia-Pacific Region and Western Europe [8].

The analysis of the ISAAC questionnaires of children living in various districts of Kharkov Region revealed significant differences in the prevalence of symptomatic manifestations of BA. Thus, the prevalence of wheezing among children was: 12.1% and 13.7% in Lozivs'kyi District, 13.2 and 7.7% in Kupyans'kyi District, 15.0% and 7.0% in Vovchans'kyi District, 12.0% and 4.0% in Bohodukhivs'kyi District, 11.7% and 9.4% in Sakhnovshchyns'kyi District, 2.8% and 10.6% in Barvinkivs'kyi District, 16.8% and 12.0% in Derhachivs'kyi District, 4.8% and 7.5% in Novovodolaz'kyi District for schoolchildren of 6–7 and 13–14 years old respectively. The average numbers of wheezing are represented in Drawing 1.

The revealed differences in prevalence of respiratory symptoms constituted the basis for planning of perspectives for future studies, in particular, the study of the role of environmental conditions, the search for other etiopathogenic factors affecting the development of BA.

3. Conclusions:

1. The current prevalence of bronchial asthma symptomatic manifestations among children of Kharkiv Region is 12.8%: at junior school age – 13.2%; in adolescence – 12.4%.

2. Over the last 19 years the prevalence of respiratory symptoms has decreased in 1.6 times in 6–7 years old children and in 2 times in adolescent age.

3. Significant differences in the prevalence of pathognomonic symptoms of BA in different districts of Kharkiv Region (from 5.5 to 14%) have been revealed, which makes it necessary to study the trigger factors of the region.

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