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PREVALENCE OF BRONCHIAL ASTHMA SYMPTOMATIC MANIFESTATION AMONG CHILDREN OF KHARKIV

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The purpose of the work was to improve the diagnosis of bronchial asthma (BA) in the pediatric population by revealing the current prevalence of symptoms using an epidemiological method and identifying trends in the prevalence of symptoms since 1998. The study was performed in 2017 in Kharkiv. The standardized method of the International Study of Asthma and Allergy in Childhood (ISAAC) was used. The volume of the sample was calculated according to the formula for sample population determining and ensures the representativeness of the data obtained (Lisitsin Y.P., 1987), which amounted to 5434 children. 3374 parents of children 6–7 years old and 2552 children 13–14 years old were surveyed; in total 5926 students, which accounted for 97% of the total number of questionnaires distributed. The standardized ISAAC questionnaire contains 8 questions about the symptomatic manifestations of BA. The percentage of positive responses in children 6-7 years old was analyzed; the results are presented for 2017, 2002 and 1998, respectively. 1. The presence of ever wheezing (wheezing) in the past (the first question of the ISAAC questionnaire) was found in 13.8%; 19.4% and 24.1% of children, respectively. 2. "Wheezing" was observed in the last 12 months in 6.6%; 12.5%; 12.2%. 3. More than three episodes of "wheezing" in the past 12 months were found in 0.9%; 2.5% and 2.3%. 4. Sleep disturbance from "wheezing" on one or more nights a week during the last 12 months occurred in 1.9%; 1.3% and 1.4%. 5. Speech was limited to wheezing during the last 12 months in 0.5%; 1.7% and 1.5%. 6. The presence of asthma in the history was noted in 1.5%; 6.8% and 5.5%. 7. "Wheezing" in chest during or after exercise during the last 12 months was at 2.0%; 10.4% and 4.6%. 8. Dry cough at night (not associated with a cold or inflammatory diseases) over the past 12 months was noted at 6.9%; 13.7% and 11.9% of children. The percentage of positive answers to 8 questions of the ISAAC questionnaire in children 13-14 years was analyzed. The results are presented on issues for 2017, 2002 and 1998 respectively: 1. - 9.9%; 29.6%; and 25.3%. 2. - 3.4%; 20.9% and 12.9%. 3. - 0.4%; 2.5% and 1.2%. 4. - 0.6%; 1.1% and 0.8%. 5. - 0.5%; 2.3% and 1.9%. 6. - 1.6%; 5.5% and 6.1%. 7. - 2.8%; 20.6% and 13.2%. 8. - 4.6%; 19.3% and 12.1%. The obtained results and the dynamics of prevalence are analyzed in comparison with both average and individual data for different regions and countries of the world. The current prevalence of respiratory symptoms in children of Kharkiv was revealed in 15.9% (10.1% in the younger school age, 5.8% in the adolescent age). The trends to reduce both the prevalence and severity of BA manifestations in the region over the past 20 years have been identified. Attention is focused on the low level of diagnosis of BA.

Keywords: children, bronchial asthma, prevalence, ISAAC.

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Bronchial Asthma (BA) is one of the most common chronic respiratory diseases among children. Its prevalence within pediatric population reaches 10% [8]. The problem of the BA also has social aspect. Among 15 mln. of people with disabilities in the world, 1% are patients with BA. The disease takes the 4th position in the structure of general disability among children aged from 10 to 14 years old [5] and substantially reduces the quality of life. BA is also a significant economic burden not only for a family but for society as well [7].

International Study of Asthma and Allergy in Childhood (ISAAC) was established in 1991 to improve the quality of epidemiological studies of allergic diseases by developing a standardized methodology and promoting international cooperation. During 25 years of research, 306 research centers were created in 105 countries, 1.96 million of children were interviewed in 53 languages and more than 500 publications were published. The ISAAC program includes four phases. During phase I of ISAAC the prevalence and severity of asthma, rhinitis, eczema in various regions of the world were determined and compared among themselves, a baseline for further research on the prevalence and severity of allergic diseases was created and the ground for further study of etiology, lifestyle, ecological, genetic, medical and other factors influencing the occurrence of allergic diseases was prepared. During phase II of ISAAC the prevalence of objective markers of allergy (IgE, skin-prick test, bronchial hyperreactivity, etc.) in children at different centers and in comparison with each other was detected, connections between markers of allergy and the leading clinical symptoms in children at different centers were set, affinities of asthma and allergy severity with risk factors and various algorithms of diseases treatment at different centers were studied, new etiological hypotheses of asthma and allergy in children were investigated. During phase III of ISAAC phase I was repeated for a period not earlier than 5 years and the tendencies in the prevalence and severity of allergic diseases at the centers, where phase I was realized, were revealed. Phase III also includes the study of prevalence and severity of allergic diseases in children at the centers that did not take part in phase I. Hypotheses regarding the pathogenesis of allergy at the individual level, taking into account environmental factors and knowledge gained, were investigated. During phase IV development and

expansion of ISAAC scope of application, especially for low- and mean-income countries, is being realized and all resources useful for asthma, rhinitis and eczema treatment are being applied [9]. In Ukraine in 1997-2003 the international ISAAC study was realized by professor Ognev V.A. at the premises of KhNMU for the first time. The study determined that actual prevalence of asthma was 98.5‰ that is 20 times more than official statistics data [3].

The purpose of the work was to improve the diagnosis of BA in pediatric population by estimating the current prevalence of the BA symptoms in children of Kharkiv and revealing the dynamics of symptoms from 1998.

Material and methods. The study has designed phase IV of epidemiological method ISAAC. It was started in 2015. Authorization for the performance of work was received from the official representative organization Global Asthma Network.

In conformance with the international ISAAC program standardized questionnaires were distributed among schoolchildren aged from 6 to 7 years old and from 13 to 14 years old. The questionnaires included passport information, allergy related questions and the option of response in the “Yes/No” format.

The sampling amount for the study was calculated by the formula of sampling population with due account of the amount of pediatric population and BA prevalence ensuring representativeness of the obtained data [5] (Lisitsin Y.P., 1987), which was 5434 children.

The results of phases I and III of the ISAAC study were compared to reveal tendencies in BA prevalence (Ognev V.A., 1998, 2002).

The study was realized in accordance 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.

Results of the study and their discussion. By means of the sampling method 5613 pupils of schools in all districts of the city were questioned using the standardized questionnaires of ISAAC in 2016-17 school years. 178 schoolchildren and their parents refused to take part in the questioning which amounted to 3% of respondents.

During questioning of 5435 parents of children aged from 6 to 7 and from 13 to 14 years old in Kharkiv about the prevalence of bronchial asthma symptomatic manifestations the answers of 865 schoolchildren were affirmative which amounted to 15.9%. Respiratory complains had 63.7% of children aged from 6 to 7 years old and 36.3% of adolescents.

The answers to all 8 questions of ISAAC questionnaire regarding symptomatic manifestations of BA compared to those of 1998 and 2002 are represented in table 1.

Thus, the analysis of tendencies as for prevalence of BA main symptomatic manifestations in children of Kharkiv over the past 19 years has shown a decrease of all symptoms except for the number of sleep disruption due to wheezing episode within the last 12 months in children aged from 6 to 7 years old.

Analysis of wheezing symptoms occurrence in the past, as well as within the last 12 months in children aged from 6 to 7 years old and from 13 to 14 years old in Kharkiv from 1998 to 2017, shows the tendency to decrease these symptoms prevalence more than two times. Comparison of BA symptoms prevalence in children of different age groups revealed predominance of primary school-aged children as distinct from results of previous years, when adolescents had prevailed.

Also, the obtained data were compared with the results of worldwide standardized research. According to the ISAAC international program 304,679 children aged 13-14 years old from 106 centers in 56 countries and 193,404 children aged 6-7 years old from 66 centers in 37 countries of the world were questioned.

Average wheezing prevalence in the world within 12 months has slightly increased from 13.2% to 13.7% over the past years (the average increase equals to 0.06% per year) among adolescents and from 11.1% to 11.6% (the average increase equals to 0.13% per year) among 6-7 aged children.

When comparing the highest global prevalence rates, obtained during phase III of ISAAC program in Latin America North America and Oceania, the data obtained in Kharkiv were lower in 1.5-2 times [10].

All over the world both symptoms prevalence and dynamics are quite different. Increasing prevalence has been registered in almost all regions of the world. But in some regions (similar to tendencies in Ukraine) decreasing prevalence was noted. Thus, the rates' decrease among adolescents was registered

in Oceania (-20.39% per year), East Mediterranean (-20.10% per year) and Western Europe (-20.07% per year) and among 6-7 years old children in Oceania (-20.21% per year).

Table 1

Results of children questioning according to the ISAAC program regarding symptomatic manifestations of bronchial asthma in Kharkiv (%)

Questions about child's breathing pattern		6-7 y.o.			13-14 y.o.		
		2017 n=3238	2002 n=1950	1998 n=2971	2017 n=2197	2002 n=2428	1998 n=3311
1. Have you ever had wheezing previously?		13.8% (447/3238)	19.4% (378/1950)	24.1% (717/2971)	9.9% (218/2197)	29.6% (719/2428)	25.3% (839/3311)
2. Did you have wheezing within the last 12 months?		6.6% (214/3238)	12.5% (243/1950)	12.2% (362/2971)	3.4% (75/2197)	20.9% (508/2428)	12.9% (426/2971)
3. How many episodes of such type of breathing did you have within the last 12 months?	1 episode	2.6% (86/3238)			1.6% (36/2197)		
	from 2 to 3	2.6% (85/3238)			1.3% (29/2197)		
	from 4 to 12	0.9% (30/3238)	2.5% (48/1950)	2.3% (69/2971)	0.4% (10/2197)	2.5% (61/2428)	1.2% (40/2971)
	more than 12	0.1% (5/3238)			0		
4. How many times (at the average) did you have a sleep disruption due to wheezing episode within the last 12 months?	never	3.7% (122/3238)			2.5% (55/2197)		
	less than once a week	1.9% (63/3238)	1.3% (25/1950)	1.4% (41/2971)	0.6% (13/2197)	1.1% (26/2428)	0.8% (25/3311)
	1 time a week or more	0.6% (19/3238)			0.2% (5/2197)		
5. Did you have such a severe attack of wheezing, that the speech was complicated to pronouncing only 1-2 words between breaths within the last 12 months?		0.5% (18/3238)	1.7% (34/1950)	1.5% (44/2971)	0.5% (11/2197)	2.3% (55/2428)	1.9% (64/3311)
6. Have you ever had asthma?		1.5% (48/3238)	6.8% (133/1950)	5.5% (163/2971)	1.6% (37/2197)	5.5% (133/2428)	6.1% (202/3311)
7. Did you have wheezing in the chest during or after physical activity within the last 12 months?		2.0% (65/3238)	10.4% (203/1950)	4.6% (136/2971)	2.8% (62/2197)	20.6% (499/2428)	13.2% (436/3311)
8. Did you have short cough at nights (not associated with cold or inflammatory diseases) within the last 12 months?		6.9% (224/3238)	13.7% (267/1950)	11.9% (353/2971)	4.6% (103/2197)	19.3% (468/2428)	12.1% (400/3311)

Severe attacks of bronchial asthma (question 5 in the questionnaire) have decreased by 3 times in the Ukrainian population over the past decades. Also the tendency of BA severe attacks episodes decrease was registered in the world (0.02% in 13-14 years old children and 0.01% in 6-7 years old children between the two phases of study). The reason of these changes may be introduction of the new method of diagnostics and treatment (using inhalation corticosteroids) [5, 6]. In comparison with the lowest indicators in the world it was defined that it was lower than in all regions investigated. The average value for our region (Northern and Eastern Europe) was 14.3 %.

It is important to analyze the information on the presence of asthma in history (question 6). It features both prevalence of the disease and diagnostics quality as well as the level of medical care for children in the country. The tendency to decrease the number of asthma diagnostics cases in children in 3 times was shown. In comparison with the international research our results are lower than the minimum values in the countries of all regions.

In accordance with the worldwide data the number of BA diagnosis has increased from 11.2% to 13.8% in average (annual increase is 0.28%). The highest rates of increase are in Oceania (+0.93% and +0.42%), Western European (+0.33% and 0.25%) and North American (+0.71% and 0.74% per year in children of 13-14 and 6-7 years old correspondingly) countries.

Also, the number of BA diagnosis has increased even in the countries where the symptoms prevalence actually hasn't increased or even has decreased. According to Garc'ia-Marcos et al., the reason of this contradiction is in the change of terminological approach as well as in more "easy" diagnosis approach when asthma is not considered as fearsome and fatal disease.

The problem of BA diagnosing in Ukraine requires special attention since detection of asthma in the region (1.5-1.6%) is lower than the lowest world data (1.8% in Lithuania, 2.1% in Russia, 2.8% in Estonia and Albania). The reasons of such low statistics in the region are not so much the decrease of

overall wheezing prevalence as terminological problems and special aspects of national healthcare system. Thus, our practice has revealed that often children with recurrent wheezing are diagnosed as not the ones having BA but the ones having recurrent bronchitis or recurrent obstructive syndrome which contradicts the international standards.

Revealed tendencies to decrease of the BA symptoms prevalence require the healthcare professionals' active study of the causes and the mechanisms of disease development.

Conclusions

1. The current prevalence of BA symptomatic manifestations among children of Kharkiv is 15.9%: at junior school age - 10.1%; in adolescence – 5.8%.
2. Over the past 19 years the prevalence of respiratory symptoms has decreased among children in approximately 3 times.
3. The main problem for Ukraine is the low percent of asthma diagnostics (13-16 times lower in comparison with the international research data) with the average prevalence of respiratory complaints.

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Реферати

ПОШИРЕНІСТЬ СИМПТОМАТИЧНИХ ПРОЯВІВ БРОНХІАЛЬНОЇ АСТМИ У ДІТЕЙ МІСТА ХАРКОВА

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Метою роботи було удосконалення діагностики бронхіальної астми (БА) в дитячій популяції шляхом встановлення сучасної розповсюженості симптомів за епідеміологічною методикою та виявлення тенденцій поширеності симптомів з 1998 року. Дослідження виконано у 2017 році у м. Харкові. Використана стандартизована методика International Study of Asthma and Allergy in Childhood (ISAAC). Розраховано обсяг вибірки за формулою визначення обсягу вибіркової сукупності, що забезпечує репрезентативність отриманих даних (Лісцин Ю. П., 1987), що склало 5434 дітей. Анкетовано 3374 батьків дітей 6-7 років та 2552 дітей віком 13-14 років; всього - 5926 учнів, що склало 97% від загальної кількості розданих анкет. Стандартизована анкета ISAAC містить 8 питань стосовно симптоматичних проявів БА. Проаналізовано процент позитивних відповідей у дітей 6-7 років – результати представлено за 2017, 2002 та 1998 рр. відповідно. 1. Наявність коли-небудь свистячого або хриплячого дихання ("wheezing") в минулому (перше запитання анкети ISAAC) - виявлено у 13,8%; 19,4% та 24,1% дітей відповідно. 2. "Wheezing" протягом останніх 12 місяців спостерігався у 6,6%; 12,5%; 12,2%. 3. Більше трьох епізодів "wheezing" протягом останніх 12 місяців - у 0,9%; 2,5% та 2,3%. 4. Порухнення сну від wheezing один чи більше ночей на тиждень протягом останніх 12 місяців мало місце у 1,9%; 1,3% та 1,4%. 5. Мова обмежувалася хрипами протягом останніх 12 місяців – у 0,5%; 1,7% та 1,5%. 6. Наявність астми в анамнезі відмітили – 1,5%;

РАСПРОСТРАНЕННОСТЬ СИМПТОМАТИЧЕСКИХ ПРОЯВЛЕНИЙ БРОНХИАЛЬНОЙ АСТМЫ У ДЕТЕЙ ГОРОДА ХАРЬКОВА

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Целью работы было совершенствование диагностики бронхиальной астмы (БА) в детской популяции путем установления современной распространенности симптомов по эпидемиологической методике и выявления тенденций распространенности симптомов с 1998 года. Исследование выполнено в 2017 году в г. Харькове. Использована стандартизованная методика International Study of Asthma and Allergy in Childhood (ISAAC). Рассчитан объем выборки по формуле определения объема выборочной совокупности, обеспечивает репрезентативность полученных данных (Лисцин Ю. П., 1987), что составило 5434 детей. Анкетированы 3374 родителей детей 6-7 лет и 2552 детей 13-14 лет; всего - 5926 учеников, что составило 97% от общего количества розданных анкет. Стандартизованная анкета ISAAC содержит 8 вопросов о симптоматических проявлениях БА. Проанализирован процент положительных ответов у детей 6-7 лет - результаты представлены за 2017, 2002 и 1998 соответственно. 1. Наличие когда-нибудь свистящего или хрипящего дыхания ("wheezing") в прошлом (первый вопрос анкеты ISAAC) - выявлено в 13,8%; 19,4% и 24,1% детей соответственно. 2. "Wheezing" в течение последних 12 месяцев наблюдался в 6,6%; 12,5%; 12,2%. 3. Более трех эпизодов "wheezing" в течение последних 12 месяцев - в 0,9%; 2,5% и 2,3%. 4. Нарушение сна от "wheezing" один или более ночей в неделю в течение последних 12 месяцев имело место в 1,9%; 1,3% и 1,4%. 5. Речь ограничивалась хрипами в течение последних 12 месяцев - в 0,5%; 1,7% и 1,5%. 6. Наличие астмы в анамнезе отметили - 1,5%; 6,8% и 5,5%. 7. "Wheezing" в груди во время

6,8% та 5,5 %. 7. "Wheezing" у грудях під час або після фізичного навантаження протягом останніх 12 місяців було - у 2,0 %; 10,4 % та 4,6 %. 8. Сухий кашель вночі (не пов'язаний із застудою або запальними захворюваннями) за останні 12 місяців відмітили – 6,9 %; 13,7% та 11,9 % дітей. Проаналізовано процент позитивних відповідей на 8 запитань анкети ISAAC у дітей 13-14 років. Результати представлено по запитанням за 2017, 2002 та 1998 рр. відповідно: 1. - 9,9 %; 29,6 %; та 25,3%. 2. - 3,4 %; 20,9 % та 12,9 %. 3. - 0,4 %; 2,5% та 1,2%. 4. - 0,6 %; 1,1 % та 0,8 %. 5. - 0,5%; 2,3% та 1,9%. 6. - 1,6%; 5,5 % та 6,1 %. 7. - 2,8 %; 20,6 % та 13,2 %. 8. - 4,6 %; 19,3% та 12,1 %. Проаналізовані отримані результати та динаміка розповсюдженості у порівнянні як з середніми, так і з окремими даними по різних регіонах та країнах світу. Встановлені сучасна поширеність респіраторних симптомів у дітей м. Харкова – 15,9 % (в молодшому шкільному віці – 10,1 %, в підлітковому віці – 5,8%). Виявлено тенденції щодо зниження як розповсюдженості, так і тяжкості проявів БА в регіоні за останні 20 років. Акцентовано увагу на низькому рівні діагностики БА.

Ключові слова: діти, бронхіальна астма, поширеність, ISAAC.

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или после физической нагрузки в течение последних 12 месяцев было - в 2,0%; 10,4% и 4,6%. 8. Сухой кашель ночью (не связанный с простудой или воспалительными заболеваниями) за последние 12 месяцев отметили - 6,9%; 13,7% и 11,9% детей. Проанализирован процент положительных ответов на 8 вопросов анкеты ISAAC у детей 13-14 лет. Результаты представлены по вопросам за 2017, 2002 и 1998 соответственно: 1. - 9,9%; 29,6%; и 25,3%. 2. - 3,4%; 20,9% и 12,9%. 3. - 0,4%; 2,5% и 1,2%. 4. - 0,6%; 1,1% и 0,8%. 5. - 0,5%; 2,3% и 1,9%. 6. - 1,6%; 5,5% и 6,1%. 7. - 2,8%; 20,6% и 13,2%. 8. - 4,6%; 19,3% и 12,1%. Проанализированы полученные результаты и динамика распространенности по сравнению как со средними, так и с отдельными данными по разным регионам и странам мира. Установлены современная распространенность респираторных симптомов у детей г. Харькова - 15,9% (в младшем школьном возрасте - 10,1%, в подростковом возрасте - 5,8 %). Выявлены тенденции по снижению как распространенности, так и тяжести проявлений БА в регионе за последние 20 лет. Акцентировано внимание на низком уровне диагностики БА.

Ключевые слова: дети, бронхиальная астма, распространенность, ISAAC.

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DIAGNOSIS OF GENERAL PHENOTYPIC CHARACTERISTICS OF A PERSON IN THE CONTEXT OF ICPO-INTERPOL REQUIREMENTS

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Topicality of this study is due to the need to find new ways to solve the problem of identifying a person in terms of an integrated approach DVI - Interpol system, and consist in to determine the patterns of manifestation of inter-system relationships and the development of criteria for predictive assessment of phenotypic human features based on phenotypology of the finger, palmar dermatoglyphics and foot dermatoglyphics. Received anthroposcopic and anthropometric parameters, imprints of the ridge patterns of the fingers and feet, the inner surface of the hands and feet, and the smears of peripheral blood from 567 men and women of 18-59 years of age living in the Ivano-Frankivsk region and belonging to the Hutsuls (1 group), Boykos (group 2) and Lemkos (group 3) ethno-territorial groups or do not identify themselves with any (group 4). The following research methods were applied: anthroposcopic, anthropometric, dermatological, one-dimensional and multidimensional statistical analysis, neural network programming (in the package Statistica 12). Reliable differences between phenotypic parameters of male and female persons of Boykos, Lemkos, Hutsuls and control groups were established; on the basis of obtained data using artificial neural networks, a computer identification program Dermatoglyphics For Prediction (DFP) was developed that will increase the effectiveness of the second and fourth stages of the Disaster Victim Identification methodological approach.

Key words: forensic medicine, person identification, dermatoglyphics, phenotype.

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In connection with the tendency to exacerbate local armed conflicts in the world and, in particular, in the territory of Ukraine, which causes the appearance of a large number of unidentified, fragmented corpses, there is a problem of identification of bodies of two or more people [3, 5].

In order to identify an unknown person, the DVI-Interpol principle uses a set of identification methods: DNA identification, dermatoglyphics identification, identification of a dental status, identification of a verbal portrait, anthropological identification, etc. However, none of the known methods today is characterized by one hundred percent result. This is why it is practiced to use several identifying algorithms simultaneously, that is, a multidisciplinary approach to identification: the use of all possible lines of evidence to reinforce the identity between human remains and the disappeared person [9].

Detailed information on the possibility of comprehensive use in forensic medicine of the ridge pattern of the fingers and feet and dermatoglyphs of the palms and feet for the diagnosis of general