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Bronchial Asthma – A Practical Approach to Diagnosis, Adaptation to the Primary Health System

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Abstract Bronchial asthma is one of the pressing problems of modern health care. Today, an estimated 358 million people worldwide suffer from asthma, accounting for 4 to 10 percent of the adult planet's population, and according to some other sources, it was suspected that by 2025 this figure would reach 400 million people. The goal is to develop an early diagnostic method for timely detection of bronchial asthma, prevention of possible complications, early approach to treatment, selection of preventive treatments. **The goal** is to develop an early diagnostic method for timely detection of bronchial asthma, prevention of possible complications, early approach to treatment, selection of preventive treatments. **Research material and methods.** The study was carried out in people with bronchial asthma in various regions of Surkhandarya region. According to the study, 64 (100 percent) patients with bronchial asthma participated in the tests, of which 23 (35.9 percent) were male and 41 (64.1 percent) were female. The study carried out methods for collecting objective and subjective materials, in-depth analysis of Anamnesis data, statistical data of disease outbreaks in Surkhandarya region, General blood analysis, serological-Idem examination, method of enhanced radiological examination of the lungs, examination of polymorphism alleles and genotypes of genes IL17A, IL23R, IL17F, spirometry. **Results.** The most common areas of bronchial asthma are Sarosian, next are the city of Termez, jargon, Sandgrouse, Goldinsoe districts. We were convinced that the main symptoms of bronchial asthma are higher in the level of salinity when compared with the control group, which is observed in almost all patients. It should be noted that during the period of sensitivity, patients experienced a lot of psychopathological conditions, faced with anxiety, fear of death, insecurity, and in the absence of sensitivity, mainly with a state of depression. among those participating in the study, we found that the mother, father or close relatives have these diseases, the most interesting is that in patients with an allergic or hereditary predisposition to one of the parents, the clinical course of the BA is mild or moderate, but in both the father and mother, their presence has led to the development of severe and In the pathology of the lungs and bronchi according to spirometry, especially in severe types of bronchial asthma, the vital capacity of the lungs, the maximum Examiner flow and the maximum volume of forced breathing decrease sharply in full-fledged breathing volume, which negatively affects not only the lungs themselves, but the brain, heart, blood and general body, completely damaging tissue performance.

Keywords Bronchial asthma, Eatra diagnosis, Spirometry, Genetic analysis, Serological examination

1. Introduction

As an open system, the respiratory organs provide a direct opportunity for complex damage to the body, at the same time, it is also considered a protective organ of the whole body, a filter. Environmental, weather, climatogeographical changes can significantly affect the structural and functional damage of the body. Diseases of the respiratory tract develop and pass depending on the conditions of the regional area, based on this, the clinical manifestations of this disease also change according to the mentioned factors. Bronchial asthma (BA) is a heterogeneous disease characterized by chronic inflammation of the lower airways and characterized by airway obstruct ion that differs in duration and intensity (wheezing, shortness of breath, cough). BA formation is a disease based on chronic inflammation, airway hyperreactivity and excessive contraction of bronchial smooth muscles in response to specific stimuli, as well as their structural restructuring [1,9].

Bronchial asthma is one of the urgent problems of modern health care. Today, more than 358 million people worldwide suffer from asthma, which is 4 to10 percent of the adult population of the planet, and according to some other sources, this number is suspected to reach 400 million people by 2025 [2,13]. BA is common in most countries such as the United Kingdom, USA, Israel, Ireland, Central American countries, New Zealand and Australia [3,18]. At the same time, in recent years in many countries of the world, the incidence of asthma, including the manifestation of this disease in early childhood, has increased significantly [4,21].

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Among the elderly population in the Russian Federation, BA is spread from 5.6 to 7.3 percent, this indicator means that it is more common than stroke, UIK, breast can cer, AIDS [5,11]. Mild forms of BA have the highest rate, from 50 to 75 percent, and timely diagnosis and proper treatment can dramatically stop the progression of the disease. The economic and social damage from BA is decreasing due to the use of new methods of diagnosis and treatment, but today this indicator still shows an amount higher than 37 billion Russian rubles [6,18]. However, despite this, the disease is diagnosed too late, and more optimal treatment strategies are often sought after the onset of complications. Bronchial asthma develops regardless of gender and age, timely diagnosis and early treatment can prevent the development of the disease and complications [7,20].

Among them, one of the most common diseases, the first mention of bronchial asthma is found in ancient Indian doctors. In the 18th century, the doctor James Anderson, who worked in one of the West Indian clinics, introduced the method of treating bronchial asthma with datura plant to Europe for the first time. The term "asthma" was first used in the four aphorisms of Hippocrates [8,12]. By this term, the author meant "heavy breathing" accompanied by wheezingornoisein "breathing". Hippocrates described this condition as more severe than dyspnea and less severe than orthopnea (dyspnea when lying down). This disease was considered a paroxysmal manifestation of respiratory distress [10,22].

Galen's contemporary, Arephaeus of Cappadocia, left amanuscript on bronchial asthma (BA) that remained largely unknown until it was published in Paris in 1554. Accor ding to the manuscript, asthma was more common in women compared to men and observed more severe sleep disturbances [13,24].

A different view of the disease began at the beginning of the 19th century, since it is a chronic disease that requires constant monitoring. In most patients with asthma, the widespreaduse of recommendations in standard protocols helps to achieve its control and serves as a key element of a practical health care system. The manage ment of patients with asthma is regulated by two main documents: the Global Initiative for Asthma (GINA) and the Russian clinical recommendations for the treatment of BA. Based on these 2 recommendations, two updated documents on the control of bronchial asthma were published in 20196 GINA guidelines for the treatment and prevention of bronchial asthma [8,14, 23] and clinical guidelines for the diagnosis and treatment of BA of the Russian Federal Respiratory Society [15]. GINA (2019) collected the treatment protocols accumulated over the years and presented a new approach to BA, a modified strategy based on strong evidence, the most updated methods of clinical application, of course, these treatment procedures cannot be carried out with out diagnosing bronchial asthma or without early detection of its presence [8,9,19].

In general, the latest international and federal clinical guidelines for the treatment and diagnosis of bronchial asthma serve as a practical guide for specialists.

Mamasoliev N.S. and all. (2023) identified epidemiological signs such as smoking, al cohol abuse, severe heredity, dietary habits of the population, insufficient consumption of vegetables and fruits, as well as low physical activity according to WHO criteria as risk factors for bronchial asthma (WHO, 1996) [20,21]. By the authors, the diagnosis of bronchial asthma was determined on the basis of clinical data: typical symptoms of sideropenic and trophic diseases, a decrease in hemoglobin level, changes in the color indicator index (hypochromic type of anemia) and blood serum indicators were considered as generally accepted methods. In general, in 2018-2019, the prevalence of respiratory diseases decreased by 100,000 in the Republic of Uzbekistan. During this period, the prevalence of asthma also decreased by 0.1% in absolute terms and by 3.5% per 100,000 population. In addition, the incidence of asthma and other respiratory diseases decreased both in absolute terms (16.3% and 1.9% reductions, respectively) and per 100,000 population (18.7% and 4.8% reductions, respectively). The dangerous situation regarding the spread of asthma is typical for Tashkent, Andijan, Jizzakh, Kashkadarya, Tashkent, Khorezm regions, and if we take into account the possibility of infection, the dangerous situation is typical for Andijan, Kashkadarya, Surkhandarya, Fergana, Khorezm regions and the Republic of Karakalpakstan [22].

Among the factors that cause this trend, urbanization and environmental weather, the destruction of the ecosystem in general, especially in large cities and megacities, are of great importance. An increase in the number of patients with severe asthma leads to a significant decrease in labor productivity and requires an increase in the costs of the health care system. In addition, asthma is one of the main causes of disability and a decrease in the quality of life of patients [4].

Taking into account the given data, studying the problem of bronchial asthma, establishing an early and timely diagnosis, early treatment, improvement of the prevention direction is urgent and important, and determines the importance and necessity of studying the subject.

The purpose of writing the article is to develop an early diagnosis method for timely detection of bronchial asthma, prevention of possible complications, early approach to treatment, and selection of preventive procedures.

2. Research Material and Methods

The study was conducted in patients with bronchial asthma in different regions of Surkhandarya region. According to the research results, 64 (100 percent) patients with bronchial asthma participated in the examinations, 23 (35.9 percent) of them were men, 41 (64.1 percent) were women. The average of the patients participating in the study was 46.4±1.43, and they ranged from 16 to 70 years. Patients were examined and monitored at the multidisciplinary medical center in Termez. In order to ensure the transparent conduct of scientific research and patient safety, contracts

were drawn up between patients and clinics, and letters of consent were obtained from patients confirming whether or not they could participate in the study. We defined the criteria for selecting or rejecting patients to participate in the study, according to which:

Patient selection criteria-patient consent; presence of BA diagnosis; mental health; absence of severe somatic disease; those over 16 years old. The criteria for rejecting patients are those with mental inadequacy, severe genetic disease, smokers (cigarettes, tobacco), severe somatic pathology, those under 16 and over 70 years old.

In order to achieve objective and real results, 64 (100 percent) patients with bronchial asthma were interpreted as group 1, and 45 practically healthy people were selected as a comparison group and recognized as group 2 (Fig. 1).

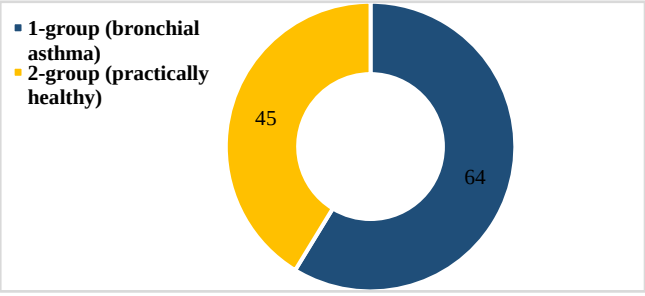

Figure 1. Group allocation and number of study participants

3. Methods and Materials of Research

The research includes collecting objective and subjective materials, in-depth analysis of anamnesis data, statistical data on the prevalence of the disease in the Surkhandarya region, general blood analysis, serological-IgE testing, enhanced X-ray examination of the lungs, spirometry, methods of checking polymorphism alleles and genotypes of IL17A, IL23R, IL17F genes. was conducted. The obtained results were compared between patients with bronchial asthma and practically healthy people.

4. Results and Their Discussion

Based on the conducted research, the prevalence of the disease was analyzed in the Surkhandarya region, and according to it, the most common area of bronchial asthma is Jarqo ‘rgon district 9 (14.1 percent), Kumkurgan district 8 (12.5 percent), Sariosiyo district 11 (17.2 percent), Termiz city 9 (14.1 percent), Denov district 8 (12.5 percent) (Table 1). At this point, it is worth saying that in the Surkhandarya region, we are witnessing the development of severe clinical manifestations of bronchial asthma, which has an allergic basis, in the districts where the environment, weather, and the ecosystem in general are disturbed.

Table 1. Prevalence of allergic rhinitis in Surkhandarya region (N=37)

Districts of Surkhandarya region.	Number of patients	Number of patients (in percentages)
Denov	8	12,5
Boysun	1	1,6
Dzharkurgan	9	14,1
Muzrabot	2	3,1
Kumkurgan	8	12,5
Sariosiyo	11	17,2
Sherabad	3	4,7
Shurchi	4	6,25
The district of Termez	6	9,4
The city of Termez	9	14,1
Altinsay	2	3,1

Let's look at Figure 2 to analyze how different these numbers are. As it can be seen from Figure 2, the most common areas of bronchial asthma are Sariosiyo, followed by Termez, Zharkurgan, Kumkurgan, Altinsay districts. We will explainthe course of bronchial asthma in the population of these regions, the level of severity, and the interpretation of complications in our analysis at the next stage.

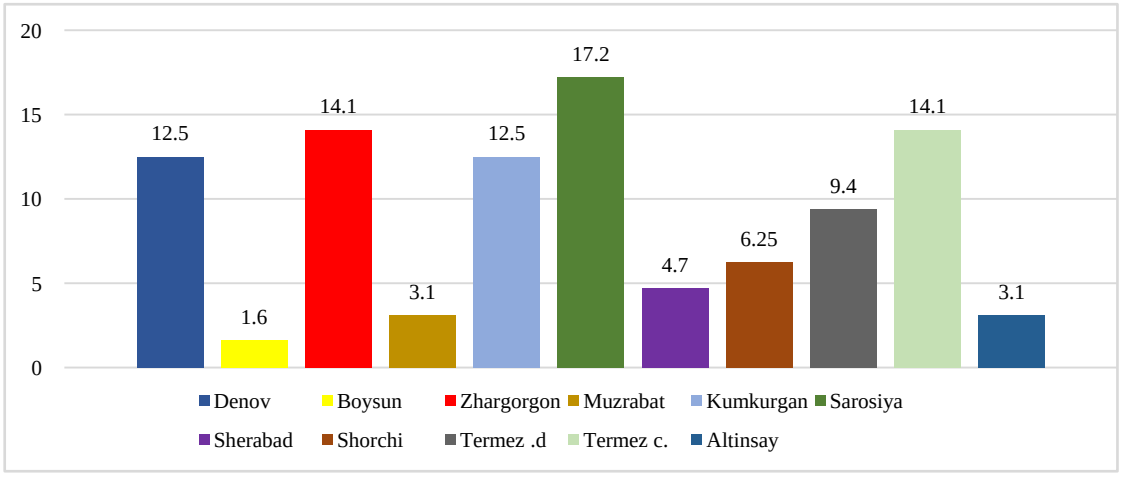

Figure 2. Distribution of the disease in the regions

The result shown in Figure 2 was interpreted according to Table 1. At the next stage, the symptoms of this disease and the prevalence of symptoms were analyzed (Table 2).

Table 2. The prevalence of subjective symptoms in patients

Symptoms of the disease	1-Group (BA) (N=64)		2-Group (control) (N=45)		P<
	abs.	percent.	abs.	percent.	
Cough	42	65,6	3	6,7	P<0,001
Panting	58	90,6	4	8,7	P<0,001
Difficulty breathing	48	75,0	2	4,4	P<0,001
Wheezing when breathing	52	81,3	6	13,3	P<0,001
Orthopnea	32	50,0	3	6,7	P<0,001
Anxiety, a feeling of fear	51	79,7	6	13,3	P<0,001
Facial swelling	28	43,8	3	6,7	P<0,001
A feeling of pain and heaviness in the chest	24	37,5	2	4,4	P<0,001
Symptoms of inflammation	41	64,1	4	8,7	P<0,001
Conjunctival hyperemia	32	50,0	6	13,3	P<0,001
Blueness of the face (cyanosis)	36	56,3	4	8,7	P<0,001

As can be seen from Table 2, the main symptoms of bronchial asthma were observed in almost all patients, and we were sure that the level of hokkaniya was high compa red to the control group. It should be mentioned that during the attack, psychopatho logical conditions were encountered in the patients a lot, restlessness, fear of death, restlessness, and when there was no attack, we encountered mostly depression. At the next stage, we continued the analysis process by studying the patients' genetic anamnesis. According to him, among the patients of the 1st group, we witnessed more occurrences of hereditary diseases in the medical history compared to the 2nd group, and the allergological anamnesis developed very rapidly (Table 3).

Table 3. Analysis of genetic anamnesis of patients

Diseases	1-Group (BA) (N=64)		2- Group (control) (N=45)		P<
	abs.	percent.	abs.	percent.	
Heart disease	21	32,8	6	13,3	P<0,001
Diabetes	12	18,8	3	6,7	P<0,001
Bronchial asthma	21	32,8	2	4,44	P<0,001
Allergic dermatoses	19	29,7	4	8,89	P<0,001
Allergic rhinitis	36	56,3	7	15,6	P<0,001
Food allergies	28	43,8	4	8,89	P<0,001
Liver diseases	32	50,0	8	17,8	P<0,01
Kidney diseases	21	32,8	7	15,6	P<0,01

Among those participating in the study, we found out the presence of these diseases in their mother, father or close relatives, the most interesting thing is that in patients with allergic or genetic predisposition, the clinical course of bronchial asthma is mild or moderate, but their presence in both father and mother is severe and extremely severe forms of the disease. We observed that it developed (Table 4).

Table 4. Results of general blood analysis of examined patients

Blood analysis indicators	The norm	Unity	1-group	2-group	P<
Hb	м.:130-160 ж.120-140	г/литр	97,2±2,12	122,4±1,23	P<0,05
RBC	3,7-5,1	$*10^{12}$/л	3,82±0,98	4,54±1,28	P<0,05
Color indicator	0,85-1,15	-	0,83±0,11	0,98±1,24	P<0,05
Thrombocyte	180-320	$*10^{9}$/л	201,2±3,03	234,6±2,43	P<0,05
WBC	4-9	$*10^{9}$/л	6,67±1,44	6,43±1,12	P=0,110
Rod nucleated leukocyte	1-6	%	4,17±1,19	3,33±1,0	P<0,05
Segmented nucleated leukocyte	47-72	%	60,3±2,31	49,4±1,28	P<0,05
Eosinophil	0-5	%	6,8±1,34	3,23±0,49	P<0,01
Basophil	0-1	%	0,72±0,10	0,03±0,0	P<0,001
Lymphocyte	18-40	%	22,8±1,79	28,7±1,43	P<0,05
Monocyte	2-9	%	5,25±1,46	3,0±0,53	P<0,05
ESR	2-15	мм/час	9,21±1,72	12,11±2,12	P<0,01

Table 5. Indications of spirometry in the presence of allergic rhinitis and bronchial asthma

Group	FVC norm	FVC	FEV 1 norm	FEV 1	FEV1/ FVC norm	FEV 1/ FVC	MMEF norm	MMEF	MEF25 norm	MEF25
Total	3,38	1,62	2,82	1,33	83,5	86,0	3,01	1,43	1,33	1,13
BA+AP	3,20	1,66	2,74	1,39	84,4	84,30	3,02	1,74	1,42	1,33
BA	3,39	1,60	2,81	1,31	83,3	85,0	2,99	1,34	1,29	1,08

We observed the following changes when the patients' blood analysis was viewed (Table 4). As we can see, in the general blood analysis, hemoglobin, erythrocyte, color index and eosinophils have more changes compared to the norm and the control group. These indicate that the patient has suffered from allergic rhinitis for a long time, and the necessary products are not absorbed into the body in the required amount. One of the main indicators of allergic background-eosinophils was clearly seen to have a higher rate in the main group, which indicated that the relative validity was true when compared to the control group. Spirometry is the most informative and completely painless research method that can detect bronchopulmonary diseases. We performed the spirometry method in 64(100 percent) patients with BA, in 9 (14.1 percent) of them, we witnessed bronchial asthma accompanied by allergic rhinitis. The use of this diagnostic procedure was recommended to determine the type of res piratory failure, the nature and degree of damage (Table 5).

According to the analysis of the results of spirometry in the general group (55 patients with bronchial asthma and 9 allergic rhinitis patients with bronchial asthma), when comparing the physiological norm and patients with the disease, we observed a 2-fold decrease in FVC and MMEF, and a 1.4-fold decrease in FEV 1, thus at the same time, we witnessed that FEV1/FVC and MEF25 did not differ from the physio logical norm. In this case, FVC is the accelerated vital capacity of the lungs; FEV1 -forced expiratory volume in 1 second; MEF- maximum volumetric velocity; MMEF – maximum mean expiratory flow. We observed a 1.92-fold decrease in FVC, a 1.97-fold decrease in FEV1, and a 1.74-fold decrease in MMEF when BA and AR were combined, with FEV 1/FVC and MEF25 almost unchanged from baseline. In the severe course of bronchial asthma, we observed a further decrease of these indicators. In particular, we observed that FVC increased by 2.12 times, FEV1 by 2.15 times, MMEF by 2.23 times, FEV 1/FVC by 1.7 units, and MEF25 remained almost the same. Therefore, in the pathology of the lungs and bronchi, especially in severe types of bronchial asthma, the vital capacity of the lungs, maximum expiratory flow and forced expiratory volume decrease sharply, the volume of full breathing decreases sharp ly, which affects not only the lungs themselves, but also the brain, heart, blood vessels and general negatively affects the body and completely damages the functioning of the tissues.

As a result of serological analysis of IgE, the volume of serological IgE antibodies increases, as in bronchial asthma and other viral or bacterial infectious diseases. Anti bodies are generally proteins that the immune system produces in response to infection. In laboratory diagnostics, it is antibodies that serve as a sign of infection. When testing serological IgE antibodies, blood is taken from a vein on an empty stomach (at least four hours after a meal). In a modern laboratory, blood serum is tested in an automatic analyzer using appropriate reagents. Sometimes serological analysis for antibodies is the only way to detect infectious diseases. However, as mentioned above allergic conditions, including bronchial asthma, are accompanied by an increase in the amount of serological IgE antibodies, and conducting this analysis allows correct diagnosis and timely quality treatment.

IgE antibodies are an allergological laboratory study aimed at determining the level of immunoglobulin E in blood serum, which is an antibody that plays an important role in the human immune system. IgE interacts with allergens (antigens) entering the body, binds to them and triggers an inflammatory reaction in the body. It is mani fested by a runny nose, skin rash, bronchitis. Major reactions include seasonal allergic rhinitis, bronchial asthma, and atopic eczema. In addition, IgE analyzes (allergy tests) allow to determine the tendency of the patient to produce excess IgE and to deter mine which specific antigens there is a reaction to. A detailed diagnosis of the type and amount of antibodies in the diagnosed disease can be made by analyzing for each specific type of allergy. In short, serological IgE analysisis one of the methods that allows to make a correct diagnosis, timely elimination of allergy-causing factors and selection of treatment tactics.

On the basis of the conducted researches, patients with bronchial asthma or the population with the possibility of this diagnosis can be diagnosed at an early stage through the methods of subjective and objective clinical examination, general blood and urine analysis, hereditary and genetic anamnesis, the method of studying the regional ecosystem, spirometry and serological IgE analysis. Selection of early treatment procedures, prevention of complications and frequent recurrence of attacks can be achieved.

5. Medical Effectiveness of the Study

Medical effectiveness is the level of achieving the result of restoring human health. On the example of a specific patient, we inter pret about restoring health, improving mental and social health, restoring damaged functions in organs and tissues. Medical efficiency at the level of healthcare institutions and the industry as a whole is measured by many specific indicators: the number of people, the number of correct and timely diagnoses, the percentage of patients treated, the duration of bronchial asthma, the reduction of transition to severe complications, the prevention of death from this disease, etc. By applying the above mentioned complex diagnosis method, medical efficiency increases with real relativity, and as a simple, convenient method, it can be used by doctors in remote rural medical centers, early diagnosis can be referred to narrow specialists, and constant monitoring can be carried out, and these actions do not require additional effort and funds. Through this comprehensive examination-diagnostic method, correct and early diagnosis was made in 64 (63.3 percent) of 101(100 percent) patients. Inpatient treatment was recommended. Timely treatment of 54 (84.4%) patients reduced the duration, recurrence, intensity and number of attacks, and eliminated symptoms such as breathing, vegetative changes, fear, restlessness, swelling of the face, shortness of breath, sleep disorders.

6. Social Significance

If we study the epidemiology of bronchial asthma, we can be sure that it is a huge problem in the health system -Today, more than 358 million people worldwide suffer from asthma, which is 4 to 10 percent of the adult population of the planet, and according to some other sources, by 2025 it is suspected that by the year this indicator will reach 400 million people. In general, in 2018-2019, the prevalence of respiratory diseases decreased by 100,000 in the Republic of Uzbekistan. During this period, the prevalence of asthma also decreased by 0.1% in absolute terms and by 3.5% per 100,000 population. In addition, the incidence of asthma and other respiratory diseases decreased both in absolute terms (16.3% and 1.9% reductions, respectively) and per 100,000 population (18.7% and 4.8% reductions, respectively). The dangerous situation regarding the spread of asthma is typical for Tashkent, Andijan, Jizzakh, Kashkadarya, Tashkent, Khorezm regions, and if we take into acco unt the possibility of infection, the dangerous situation is typical for Andijan, Kashkadarya, Surkhandarya, Fergana, Khorezm region sand the Republic of Karakalpakstan.

Among the factors that cause this trend, urbanization and environmental weather, the destruction of the ecosystem in general, especially in large cities and megacities, are of great importance. An increase in the number of patients with severe asthma leads to a significant decrease in labor productivity and requires an increase in the costs of the health care system. In addition, asthma is one of the main causes of disability and a decrease in the quality of life of patients, severe bronchial asthma is explained by the frequent occurrence of attacks, a sharp decrease in breathing, a decrease in saturation, damage to the heart, vascular system, and finally death. In practice, early detection, prevention, preventing the development of complications and timely initiati on of preventive therapy allow to reduce premature death and disability.

7. Conclusions

1. The result of the analysis showed that the developed method of early diagnosis of bronchial asthma makes it possible to detect the disease early and start treatment as early as possible;
2. As a result of early diagnosis and early treatment, medical, social and economic efficiency of disease treatment is achieved;
3. Subjective, objective, anamnestic, instrumental, and laboratory examinations of patients will be carried out systematically, early diagnosis of the disease and referral to narrow specialists and selection of differential treatment procedures will be sys tematically implemented.

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