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EPIDEMIOLOGICAL CHARACTERISTICS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN THE CLIMATIC CONDITIONS OF THE FERGANA VALLEY OF UZBEKISTAN, 11-YEAR TREND

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Abstract:

11-year epidemiological monitoring was carried out in the climatic conditions of Namangan, Fergana Valley, Uzbekistan. Men and women aged ≥ 18 – 89 years were taken as its object. A total of 1481 residents (660 men and 821 women) were examined. Standardized and unified epidemiological examination methods were used, specific characteristics of chronic obstructive pulmonary disease (COPD) were confirmed.

For example, in the population seeking primary and secondary care, COPD is detected with a high prevalence. In the last 11 years, the rate of "growth" of COPD in women is more "intense" than in men, and among the leading factors of such a trend, aboriginality, literacy, rural factor, social status, hard work and professional harmful habits are confirmed.

Keywords: chronic obstructive pulmonary disease, epidemiology, risk factors, COPD prevention

During the last 10 years, the epidemiologic conditions and environmental conditions for chronic obstructive pulmonary disease (COPD) have changed dramatically. Taking this into account, developing and changing preventive and treatment practices in a scientifically based manner is considered a need, necessity and urgent topic for world science [7, 11], including in the changing climatic, ecological and medical conditions of Uzbekistan.[1]

In the second decade of the 21st century, epidemiological, clinical and fundamental researches have made and recognized such meaningful conclusions [17,18]. They significantly expanded the existing scientific, practical, social, economic, ecological and medical-preventive perceptions of COPD. In particular, the long-term protracted course of the disease continues with minimal clinical manifestations. As a result, COPD is diagnosed at a late, to some extent irreversible stage of complications. In this situation, the medical care used in the disease becomes more expensive, and secondly, their effectiveness decreases to the point of loss and/or begins to cause danger [18, 19].

[1] Decree of the President of the Republic of Uzbekistan dated January 28, 2022 PF - No. 60 "On the new development strategy of Uzbekistan for 2022-2026"

Judging by the official statistics, it is clear that the disease continues to become a global problem: • the frequency of the disease is unevenly recorded up to 26.6%, and the losses from it will only increase until 2030; • every year 2.75 million people die from COPD, which is 4.8% of all deaths and is the 3rd leading cause of death in the world; • COPD takes the 2nd place after lung cancer in terms of economic costs and/or reaches 1522 dollars per year, and according to ERS, its annual value is 38.4 billion. is estimated in euros [1,4,9,10].

In special epidemiological studies, these numbers can be several times higher. This shows the importance of epidemiological indicators and biomarkers ("reporter risk factors") in the early detection and prevention of OSC, which serve as a basic scientific resource for defining a new system and strategy for responding to the disease.

In this direction, it is necessary to carry out targeted research to create an epidemiological model of COPD in the modern population and to develop a suitable program of treatment and prevention.

The modern situation requires not only to increase the scope of epidemiological research, but also to improve its modern directions towards medical-ecological pharmacocontrol, pharmacoepidemiology, pharmacoeconomics, and active prevention (with and without drugs). Evidence and reasons for this are given in scientific research: • in the last 56 years, the death rate of the population from COPD has increased from 3.3 times (in men) to 15 times (in women) [DALY, 2020]; • only 25.0 percent of the total COPD is determined on time [IBEYaROS, 2000]; • Specific

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clinical symptoms of COPD appear only in the initial stage in 27.0%, and the patient's quality of life is not significantly impaired; therefore, strong and appropriate prevention, dispensation and "targeted" pharmacotherapy are not carried out, the disease is correctly diagnosed only in its severe stages; • as a result, in practice, only the frequency of spread of COPD in the clinically expressed stages is calculated, or the true number of the disease remains undetermined; • therefore, in some large and medically developed countries, every 11th OSC is ignored without being included in statistical reports, and/or the true prevalence of OSC among the population is still unknown [6]. Risk factors (social, economic, genetic, cultural, environmental, medical) of COPD have been studied, but they have not been determined reliably in different regions and population groups (using unified and standardized methods). Due to the lack of precise regular epidemiological studies, the epidemiologic characteristics of COPD and its risk factors have not been fully studied and defined. In this regard, carrying out new scientific research and solving the indicated problems will undoubtedly gain scientific and practical potential. Because COPD and its internal (hereditary factors, respiratory hypersensitivity, congenital lung defects) and external factors (tobacco smoking, occupational dust and chemicals, atmospheric pollutants, household pollutants, infections, socio-economic factors, nutritional factors, alcoholism) have certain frequencies. it is observed with the features of "floating" in geographical-ecological regions or is recorded with relatively high frequencies in developed countries [3,4,8]. From the studies devoted to the study of the problem of COPD, the following issues, which have become relevant for new scientific topics, and the emerging needs arise: 1) professional factors are considered to be an insufficiently studied and underestimated risk factor for COPD; 2) prospective epidemiological monitoring on the study of the relationship between the unfavorable ecological situation and COPD was almost not carried out, although in many areas an unfavorable (pathogenic) ecological situation arose, for example, in Russia, more than 30 million tons of air pollution from industrial enterprises and about 200 million tons from cars are harmful to the atmosphere every year. substances fall, or the eco-stress factor corresponds to 400 kg/year per person; 7) bio-organic fuels (burning trees, burning manure, burning coal and burning straw) are widely used by the population, especially in rural conditions, it is confirmed that the frequency of detection of COPD increases under the influence of the smoke generated in these situations; 4) increased concentration of air pollutants (industrial smoke components and photochemical smoke components) has prognostic significance in COPD.[1,2,3]

Therefore, based on the ecological situation, which is predicted to become more and more complicated, the implementation of eco-epidemiological scientific research, especially in Uzbekistan, is considered a promising and effective preventive direction. In this way, early detection and/or forecasting of COPD in the pre-disease stage, as well as quality and effective delivery of medical care (prophylactic programs, strengthening of pharmacocontrol) to the population at risk will be achieved.

Existing studies also offer different interpretations and even conflicting scientific evidence for OSC treatment programs. In order to clarify them and, again, to deliver the full power of therapy to the invisible part of the "COPD iceberg", it is recommended to carry out pharmacoepidemiological (FE) observations [5,12,13]. At the same time, it became clear to us from the review of the literature (compared to clinical and fundamental investigations) that scientific research of this essence is completely insufficient on a global scale, and in the territory of Uzbekistan, it was found that it was not conducted at all using modern criteria.

[1]Belyakov V.D. Methodological foundations of the medical ecological zoning // Vkn.: Regional problems of health in Russia. – M.: 1993.

[2] Andijan Region "Nature Protection Committee" data 2012-2013

[3]Andijan Region "Sanitary Epidemiology Center" 2012-2013 data.

The great social and economic significance of the problem, the steady growth trend of COPD-related losses and the need to identify new risk factors affecting the development of this disease in the regions motivated the planning of this study. The aforementioned was the basis for justifying our research based on this complex eco-epidemiological and prospective (11-year) pharmacoscreening monitoring as a priority scientific topic that has become appropriate and modern, a need and a necessity for the science and medical practice of Uzbekistan.

RESEARCH MATERIAL AND METHODS. An 11-year epidemiological study (monitoring) was carried out in the Namangan climate of the Fergana Valley of Uzbekistan. As its object, a population of men and women ≥ 18 – 90 years of age with OSOC observed in the emergency department of Namangan in 2010 –

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2020 was taken. A total of 1481 residents were examined (660 men and 821 women). The investigation was carried out according to the developed program and ensuring the fulfillment of the requirements set by WHO for epidemiological scientific studies (WHO, 2020).

Questionnaire, biochemical, instrumental, general clinical, ecological, special and pharmaco-epidemiological methods were used in the research. "Questionnaire for non-infectious chronic disease screening" was used for survey. The questionnaire consists of 18 sections and 378 questions, approved for use in the conditions of Uzbekistan (2020). The Medical Research Council Dyspnea Scale (2010) was used to assess the degree of dyspnea and the GOLD questionnaire was used. "Pharmacoepidemiological screening questionnaire" was used to study the problem of drug selection at COPD (S.I. Mavlyanov, 2018). Risk factors were diagnosed according to the recommendations of the World Health Organization (1999). The following instrumental examination methods were used for epidemiological diagnosis: ECG, chest x-ray, ultrasound examinations, computed tomography (MRT), spirometry, peak flowmetry, and, if necessary, pharmacological tests (tests with bronchodilator drugs). The criteria and recommendations of the Global Initiative for Chronic Obstructive Lung Diseases - GOLD 20 and the European Respiratory Society were used in the assessment of COPD [14,16].

Epi Info, SpSS Statistics, and Excel 2021 of the Microsoft office suite were used in the statistical analysis of the research results. Qualitative changes were compared using Pearson's Xi2 test. Correlation analysis was performed using Spearman's rank correlation.

Research results and discussion.

The frequency, gender characteristics and 11-year changes of COPD in patients treated at the Namangan emergency medical center, regional specific aspects depending on social factors were analyzed and evaluated (table 1). A similar prospective analytical epidemiological study for comparative evaluation of the obtained results was almost never found in modern conditions and on the scale of Uzbekistan. Most of them have a clinical nature, the methodology is completely different, and the examination period was short-term [A.M. Ubaidullaev, 2004].

The numerical statement of the table gives the following conclusions: • in the population of men and women (residents in the conditions of Namangan) COPD is observed with a detection frequency of 44.6 and 55.4 percent (R< 0.05); • prevalence of disease in aboriginal (sedentary) and immigrant men and women

1 – Table

Epidemiological indicators of COPD in the general population of Namangan, in men and women

The population examined	≥ 18 – 89 year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
	n / %	n / %	n / %	n / %	n / %	n / %	n / %	n / %	n / %	n / %	n / %	n / %
Men	660 / 44,6	650 / 98,5	10 x / 1,5	452 / 68,5	208 / 31,456	8 xx / 1,2	652 / 98,8	154 / 23,3	31 / 4,7	475 / 72,0	129 / 19,5	531 / 80,5
Women	821 x / 55,4	815 / 99,3	6 / 0,7	537 / 65,4	284 / 34,6	4 / 0,5	817 / 99,6	163 / 19,9	30 / 3,7	628 / 76,5	172 / 21,0	649 / 79,0
General population	1481 / 100,0	1465 / 98,9	16 / 1,1	989 / 66,8,7	492 / 33,2	12 / 0,8	1469 / 99,2	317 / 21,4	61 / 4,1	1103 / 74,5	301 / 20,3	1180 / 79,7

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Note: in rate - in absolute number, in denominator in percentage; I - aboriginal population, II - alien; III - rural population, IV - urban population; V – population with low education, VI – with medium and higher education, VII – population with a good and satisfactory social status, IX – population engaged in physical and mental work, XI – population working in harmful occupations

98.5 and 99.5 percent and 1.5 and 0.7 percent (R< 0.05) are defined as appropriate; • in rural male and female populations, the frequency of detection of COPD is 68.5 and 65.4 percent (R> 0.05), and in urban areas it is 31.5 and 34.6 percent (R> 0.05), that is, in rural conditions, almost two reaching parity, multimorbidity is confirmed; • the frequency of observation of COPD in men and women with low and high education is 1.2 and 0.5 percent (R< 0.01), 98.8 and 99.5 percent (R> 0.05), respectively; • men and women with good and satisfactory social status - 23.3 and 19.9 percent (R> 0.05), 4.7 and 3.7 percent (R> 0.95); • the detection rate of COPD in men and women engaged in physical activity is 72.0 and 76.5 percent (R< 0.05); the frequency of detection of COPD in men and women with harmful effects of occupation - 80.5 and 79.5 percent (R> 0.05); • frequency of disease is observed in men and women engaged in mental work - 19.5 and 21.0 percent (R> 0.09).

One of the goals of the research carried out in Namangan was to determine the trends of epidemiological indicators of various forms of COPD in men and women ≥ 18-90 years old in 2010-2020. In Table 2, the results of the study of the emphysematous phenotype of COPD (COPD ef) are numerically expressed and summarized.

The 2010-2020 annual epidemiological trend of emphysematous phenotype of chronic obstructive pulmonary disease (COPD) is described with a prevalence of 14.3 percent, as shown in Table 2. Over 11 years, the frequency of detection of COPDef in the general population is confirmed in the indicator of 35.7 - 35.5 percent with an insignificant difference.

The 11-year trend of COPDef is recorded with a decrease of 0.2 percent. The prevalence of COPDef in men and women is determined by 40.4 and 32.8 percent with a statistically reliable difference (R = 0.68). In the years of investigation, this type of COPD was described in the following distribution frequencies in men and women: in 2010 - from 43.3 and 28.9 percent (R = 0.13), in 2011 - from 35.7 and 38.2 percent (R = 0.58), in 2012 - from 33.3 and 38.6 percent (R = 0.000), in 2013 - from 42.0 and 32.4 percent (R = 0.79), in 2014 - from 43.9 and 26.8 percent (R = 0.00), in 2015 - from 39.2 and 33.7 percent (R =0.92), in 2016 - from 33.9 and 39.4 percent (R =024), in 2017 - from 42.9 and from 33.0 percent (R = 0.19), in 2018 - from 41.0 and 33.7 percent (R = 0.16), in 2019 - from 37.2 and 38.8 percent (R = 0.72), 2020 - from 33.3 and 37.3 percent (R = 0.29).

2 – Table
Epidemiology of COPD with emphysematous phenotype in Namangan population and gender interpretation of 11-year trend

Audit years	Male population aged 18-90			P	Female population aged 18-90			Female population aged 18-90		
	N	UTI Emphysematosis			N	UTI Emphysematosis		N	UTI Emphysemaoз	
		n	%			n	%		n	%
2010	67	29	43,3%	0,13	76	22	28,9%	143	51	35,7%
2011	42	15	35,7%	0,58	34	13	38,2%	76	28	36,8%
2012	42	14	33,3%	0,00	83	32	38,6%	125	46	36,8%
2013	50	21	42,0%	0,79	68	22	32,4%	118	43	36,4%
2014	66	29	43,9%	0,00	56	15	26,8%	122	44	36,1%
2015	74	29	39,2%	0,92	86	29	33,7%	160	58	36,3%
2016	59	20	33,9%	0,24	66	26	39,4%	125	46	36,8%

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2017	70	30	42,9%	0,19	115	38	33,0%	185	68	36,8%
2018	61	25	41,0%	0,16	98	33	33,7%	159	58	36,5%
2019	78	29	37,2%	0,72	80	31	38,8%	158	60	38,0%
2020	51	17	33,3%	0,29	59	22	37,3%	110	39	35,5%
20 years of dynamics	267	108	40,4%	0,68	317	104	32,8%	1481	212	14,3%
RR:1,23 CI-low:0,88 CI-up:1,73 Хи2:3,66 p:0,056										

The 11-year COPDef trend was interpreted as a 10.0% decrease in the disease in men, and an 8.4% "increase" in women. Compared with the results of other studies, these indicators generally confirm the global OSC trend: the pace of the increasing OSC trend is significantly "stronger" in women than in men and is projected to continue [2,6,10,12].

The results of statistical processing confirmed that the male gender is significant in the development of COPDef (RR = 1.23). But the confidence interval, Xi² and Pearson's R test showed that this result was not statistically significant [CI - IOW: 0.88, CI - up:1.73; Xi² = 3.66; R = 0.056).

The bronchitic phenotype of COPD (COPDbf) was confirmed in the 11-year follow-up, which is determined with a prevalence of 48.1% in the population of Namangan aged > 18-90 years: 49.2% in the female population and 52.9% in the male population (R = 0.71). The growth rate is 0.6 percent in the general population, 4.7 percent "decrease" in women, and 6.6 percent "increase" in men. COPDbf has a high prevalence of 3.0 percent in women. It was clinically proven that male gender has a protective role in the development of the bronchitic phenotype of COPD(RR = 0.94). But the confidence interval (II), Xi² and Pearson's R test showed that this result was not statistically significant [CI - IOW = 0.77; CI - up = 1.15; P = 0.261]. These analyzes are summarized and numerically presented in Table 3.

The 11-year trend of the epidemiological description of COPDbf was interpreted by the frequency of detection in the following difference in the male and female population (table 3): in 2010, in men - 46.3 and 53.9 percent (R = 0.12), in the general population - 50.3 percent; 2011 - from 45.2 and 44.1 percent (R = 0.30), 44.7 percent in the general population (UP); 2012 - 59.5 and 45.8 percent and 50.4 percent (R = 0.03); 2013 - from 48.0 and 45.6 percent (R = 0.21), 46.6 percent in UP; 2014 - 40.9 and 60.7 percent (R = 0.22) and 50.0 percent; in 2015 - 44.6 and 50.0 percent (R = 0.13) and 47.5 percent in UP; 2016 - 47.5 and 50.0 percent (R = 0.38) and 48.8 percent; 2017 - from 42.9 and 49.6 percent (0.00035) and 47.0 percent; 2018 - 44.3 and 50.0 percent (R = 0.00167) and 47.8 percent; 2019 - 46.2 and 45.0 percent (R = 0.99) and 45.6 percent; 2020 - 52.9 and 49.2 percent (R = 0.71) and 50.9 percent.

3 – Table
Epidemiology and 11-year gender interpretation of bronchitic phenotype of COPD in Namangan population

Audit years	Male population aged 18-90			P	Female population aged 18-90			Female population aged 18-90		
	N	Bronchial copd			N	Bronchial copd		N	bronchial copd	
		n	%			n	%		n	%
2010	67	31	46,3%	0,12	76	41	53,9%	143	72	50,3%
2011	42	19	45,2%	0,30	34	15	44,1%	76	34	44,7%
2012	42	25	59,5%	0,03	83	38	45,8%	125	63	50,4%
2013	50	24	48,0%	0,21	68	31	45,6%	118	55	46,6%

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2014	66	27	40,9%	0,22	56	34	60,7%	122	61	50,0%
2015	74	33	44,6%	0,13	86	43	50,0%	160	76	47,5%
2016	59	28	47,5%	0,38	66	33	50,0%	125	61	48,8%
2017	70	30	42,9%	0,00035	115	57	49,6%	185	87	47,0%
2018	61	27	44,3%	0,00167	98	49	50,0%	159	76	47,8%
2019	78	36	46,2%	0,99	80	36	45,0%	158	72	45,6%
2020	51	27	52,9%	0,71	59	29	49,2%	110	56	50,9%
20 years of dynamics	660	307	46,5%	0,000001	821	406	49,5%	1481	713	48,1%
RR:0,94 CI-low:0,77 CI-up:1,15 Хи2:1,26 p:0,261										

Based on the results of the research, the population "living with chronic obstructive pulmonary disease and bronchial asthma" (ASO - population) was separated and studied in the conditions of Namangan. From the foreign results, it was determined with a sharp, high rate, different epidemiologic indicators and 11-year trends: • Bronchial asthma combined with COPD with a prevalence of 15.3% in the population of Namangan (14.4% in men and 16.1% in women ; R = 0.001279) was confirmed. This indicator is 13.5% higher than the European population and 10.0% higher than the data obtained in the USA [15].

ASO was recorded in the general population, in the conditions of Namangan, with the following changes in different years: -14.0% in 2010, 18.4% in 2011, 12.8% in 2012, 16.9% in 2013, 2014 13.9 percent in 2015, 16.3 percent in 2016, 14.4 percent in 2017, 16.2 percent in 2018, 15.7 percent in 2018, 16.5 percent in 2013, and 13.6 percent in 2020. In the previous 10 years, there was only an "increase" in the rate of ASO, in the last year, that is, by 2020, it began to decrease, or its frequency decreased by 0.4 percent.

A similar 11-year trend and specific epidemiologic interpretation was found in both men and women, but with differences, in the area examined for ASO; In 2010 - from 10.4 and 17.1 percent (R = 0.09), in 2011 - from 19.0 and 17.6 percent (R = 0.41), in 2012 - from 7.1 and 15.7 percent (R < 0.01), in 2013 - from 10.0 and 22.1 percent (R < 0.01), in 2014 from 15.2 and 12.5 percent (R = 0.26), in 2015 - 16.2 and from 16.3 percent (R = 0.59), in 2016 - from 10.6 and 18.6 percent (R = 0.13), in 2017 from 17.4 and 14.3 percent (R = 0.05), In 2018 - from 14.8 and 16.9 percent (R = 0.08), in 2919 - from 16.7 and 16.3 percent (R = 0.99), in 2020 from 13.7 and 13.6 percent (R = 0.72) was interpreted as expressed.

In 11 years, the frequency of detection of ASO is observed with an increase of 3.3% in men and a decrease of 3.5% in women, and in general, ASO is confirmed with almost no difference in both ethnic groups (from 13.7 and 13.6%).

This information has potential value in defining prevention programs and improving them with forecasting activities. Based on the climatic, ecological and medical conditions of the valley, and the epidemiological distribution of the population in relation to COPD, these results serve as the basis for creating treatment and prevention algorithms for this disease.

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