

MECHANISMS OF FORMATION OF CHRONIC BRONCHIAL OBSTRUCTION COMORBIDITY BACKGROUND IN RURAL POPULATION DEPENDING ON AGE

Toshmatov B. A.
Mamasaliev N. S.
Tursunov X. X.
Mamasaliev Z. N.
Usmonov B. U.

Andijan State Medical Institute Uzbekistan, Andijan

ABSTRACT	KEYWORDS
Clinical and epidemiological studies show that bronchial obstruction associated with bronchial asthma and chronic obstructive pulmonary disease is widespread among the population of different ages and that its frequency of detection varies in regions. Therefore, interest in these diseases as a priority scientific direction is increasing every year. Early detection of chronic bronchial obstruction diseases and comorbid background allows for the provision of appropriate preventive care to the population at the prenosological stage. Priority attention to this scientific topic, the conduct of scientific work in this direction requires the optimization of modern epidemiological and prenosological-prophylactic technologies. With more than three-quarters of the world's chronic obstructive pulmonary disease cases occurring in low- and middle-income countries, addressing this chronic disease is a major and growing challenge for health systems. Without targeted population-based efforts and health system reforms in these areas, and without adequate funding, achieving a significant reduction in the global burden of chronic obstructive pulmonary disease may be difficult. According to research, the number of COPD cases worldwide among people aged 25 years and older will increase by 23% from 2020 to 2050, reaching nearly 600 million people worldwide by 2050. The increasing burden of COPD is projected to be greatest among women and in low- and middle-income regions.	Bronchial asthma, chronic obstructive pulmonary disease, bronchial obstruction, epidemiology, prevention, treatment.

Introduction**МЕХАНИЗМЫ ФОРМИРОВАНИЯ ХРОНИЧЕСКОЙ БРОНХИАЛЬНОЙ ОБСТРУКЦИИ И СОПУТСТВУЮЩИЕ ЗАБОЛЕВАНИЯ В СЕЛЬСКОЙ МЕСТНОСТИ В ЗАВИСИМОСТИ ОТ ВОЗРАСТА****АННОТАЦИЯ:**

Клинические и эпидемиологические исследования показывают, что бронхиальная обструкция, ассоциированная с бронхиальной астмой и хронической обструктивной болезнью легких, широко распространена среди населения разных возрастных групп, а частота ее выявления варьируется в зависимости от региона. Поэтому интерес к этим заболеваниям как к приоритетному научному направлению растет с каждым годом. Ранняя диагностика хронической бронхиальной обструкции и сопутствующих заболеваний позволяет обеспечить надлежащую профилактическую помощь населению на пренатологическом этапе. Приоритетное внимание к этой научной теме, ведение научной работы в этом направлении требует оптимизации современных эпидемиологических и пренатологическо-профилактических технологий.

Учитывая, что более трех четвертей случаев хронической обструктивной болезни легких в мире приходится на страны с низким и средним уровнем дохода, борьба с этим хроническим заболеванием является серьезной и растущей проблемой для систем здравоохранения. Без целенаправленных усилий на уровне населения и реформ системы здравоохранения в этих регионах, а также без адекватного финансирования, добиться значительного снижения глобального бремени хронической обструктивной болезни легких может быть сложно.

Согласно исследованиям, число случаев ХОБЛ во всем мире среди людей в возрасте 25 лет и старше увеличится на 23% в период с 2020 по 2050 год, достигнув почти 600 миллионов человек во всем мире к 2050 году. Прогнозируется, что наибольшая нагрузка от ХОБЛ будет приходиться на женщин и регионы с низким и средним уровнем дохода.

Ключевые слова: бронхиальная астма, хроническая обструктивная болезнь легких, бронхиальная обструкция, эпидемиология, профилактика, лечение.

Introduction

Preventive medicine is one of the most relevant areas in modern medicine, dedicated to studying the causes of chronic non-communicable diseases (NCDs), the leading form of which is chronic bronchial obstruction (CBO), and preventing fatal and non-fatal complications [2].

In preventive medicine schools, especially in the main areas (epidemiology of STDs/SBO, primary and secondary prevention, rehabilitation), urgent new projects are being implemented - methodological developments in population dispensary studies, the use of high technologies and digital medicine, etc. However, the lack of popularization of such studies at the regional or regional level is known from scientific sources; that is, researchers indicate the need to expand research on these topics [9; 14; 10; 5; 3; 4; 1; 6; 7.]. According to Campbell D.J. et al. (2014), the concept of "prevention" in STDs/SBO is directly related to the implementation of self-management (SMB), but less than 50% of clients adhere to it [8.].

A review of the literature has shown that the association between lung function and most common risk factors, such as overweight and obesity, remains unclear or controversial [13; 12; 11.].

In most cases, SBO, as can be seen from the above, proceeds with exacerbation, in most cases it does not respond to treatment methods, and the etiological causes/risk factors remain unclear. Therefore, the search for and improvement of the current predictive directions, preventive aspects, specific clinical manifestations and regional specific aspects of SBO are an urgent scientific direction and necessity.

The aim of the study – The aim of the study is to study and identify the epidemiological characteristics of chronic bronchial obstruction in emergency medical care settings and at the population level.

Material and methods

The object of the study was a representative group of 510 men and women aged 18-70 years, selected by a 10% sample from the population of Andijan (5059 people). The prospective study was conducted in the population of Andijan Branch of the Scientific Center of the Republic Emergency Medical Aid in 2015-2020 and 2022-2024 (129 out of 1229 people, a 10% sample) and in 2022-2024 in a representative population of 381 people from the Pakhtaabad district of Andijan region, identified in a 10% sample, and SBO (prevalence, risk factors, comorbidity background, gender characteristics) was analyzed.

The subjects of the study were venous blood, risk factors, clinical, instrumental indicators, sputum analysis, biochemical indicators (cholesterol, triglycerides, creatinine, glucose, microelements) in blood serum samples, and laboratory indicators (complete blood count, complete urine analysis).

Research methods. The study used epidemiological, clinical, general laboratory, biochemical, instrumental and statistical assessment methods. They served to form a prenosological, predictive and clinical diagnosis.

Results

The expression of comorbidity of chronic bronchial obstruction in a rural population of different ages was studied (the obtained results are presented in Table 1 and Figure 1).

The analyses show that the frequency of detection of ischemic heart disease comorbidity with SBO in different age groups of this population was recorded as follows: 18-21 years old - 2.5%, 22-44 years old - 36.1%, 45-59 years old - 35.2%, 60-74 years old - 25.4%, and ≥ 75 years old - 0.8% [RR=1.05; 95% CI=0.76-1.46; $X^2=0.1$; P=0.749].

Comorbidity of SUE in the rural population with SBO was observed with the highest frequency of detection in 22-44 (34.4%) and 45-59 years old (46.7%); in other age groups – 1.1% (18-21), 15.6% (60-74) and 2.2% were noted [RR=1.17; 95% CI=0.79-1.75; $X^2=0.61$; P=0.436]. The data also show that comorbidity of digestive diseases was characterized by detection rates of 3.2% in 18-21 years old, 38.9% in 22-44, 35.8% in 45-59, 22.1% in 60-74 and 0.0% in ≥ 75 years old [RR=0.92; 95% CI=0.64-1.33; $X^2=0.19$; P=0.663].

The incidence of pneumonia with comorbidity of SBO increased with age - 8.8% in 18-21 years, - 34.4% in 22-44 years, -35.2% in 45-59 years, -20.0% in 60-74 years, and -1.6% in ≥ 75 years [RR=0.86; 95% CI=0.67-1.93; $X^2=0.94$; P=0.332].

The prevalence of DM2 comorbidity was confirmed at rates of 1.9% (18-21), 35.2% (22-44), 44.4% (45-59), 18.5% (60-74), and 0.0% (≥ 75) [RR=1.14; 95% CI=0.67-1.93; X²=0.23; P=0.629].

Table 1 Prevalence characteristics of chronic bronchial obstruction comorbidity background in a rural population of different ages

Comorbid diseases, rural population, ≥ 15-75 years	Control groups, age										RR	95 %CI		χ²	P
	18 - 21		22 – 44		45 – 59		60 - 74		≥ 75						
	n	%	n	%	n	%	n	%	n	%					
CHD	3	2,5	44	36,1	43	35,2	31	25,4	1	0,8	1,05	0,76	1,46	0,1	0,749
CHF	1	1,1	31	34,4	42	46,7	14	15,6	2	2,2	1,17	0,79	1,75	0,61	0,436
GD	3	3,2	37	38,9	34	35,8	21	22,1	0	0,0	0,92	0,64	1,33	0,19	0,663
GP	1	2,9	11	32,4	9	26,5	12	35,3	1	2,9	1,17	0,59	2,33	0,2	0,651
Pneumonia	11	8,8	43	34,4	44	35,2	25	20,0	2	1,6	0,86	0,63	1,17	0,94	0,332
T2DM	1	1,9	19	35,2	24	44,4	10	18,5	0	0,0	1,14	0,67	1,93	0,23	0,629
CA	2	3,8	20	37,7	17	32,1	13	24,5	1	1,9	0,91	0,54	1,54	0,12	0,734
Total	22	3,8	205	35,8	213	37,2	126	22,0	7	1,2					

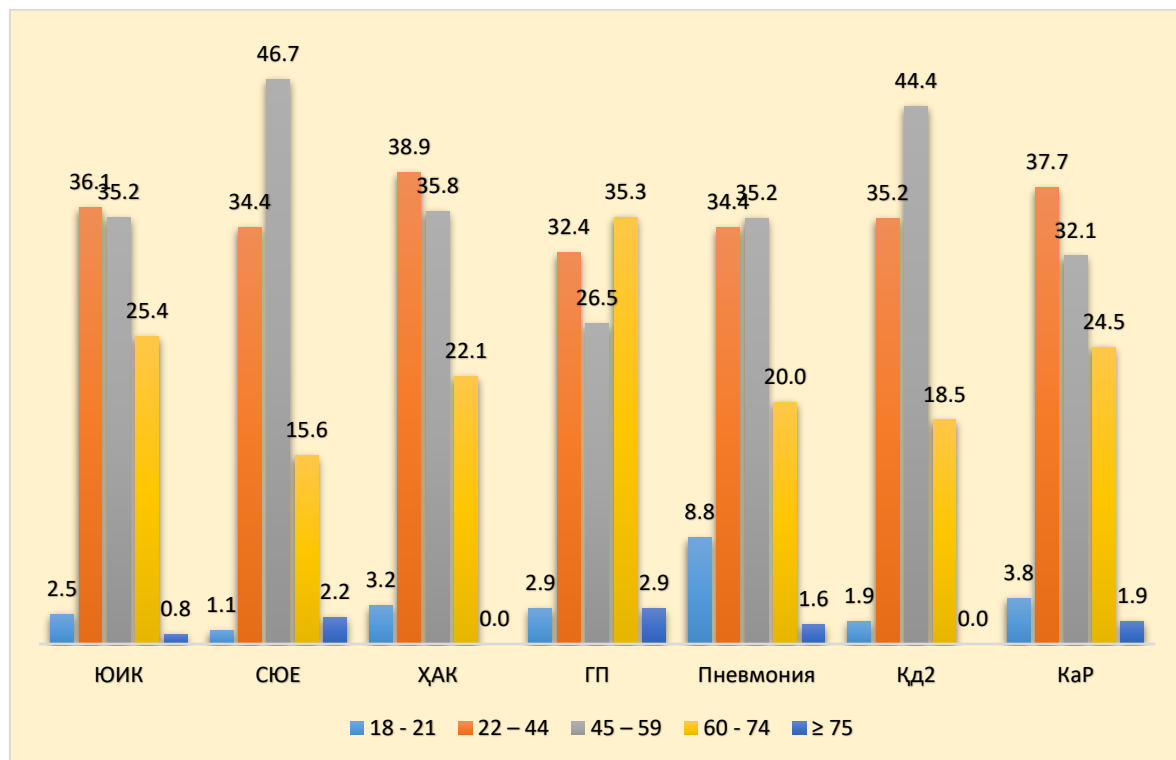


Figure 1. Expression of the formation of comorbidity background in a rural population with SBO, depending on age.

It is worth noting that comorbidity of cardioarrhythmias is also observed in the rural population with SBO - up to 37.7% and 32.1%; the prevalence of KaR at relatively high frequencies (except for 22-44 and 45-59 years old) is also noted in 60-74 years old (24.5%). In 18-21 and ≥ 75 years old, this

comorbidity is observed with frequencies of 3.8% and 1.9%, respectively [RR=0.91; 95% CI=0.54-1.54; X²=0.12; P=0.734].

Overall, comorbidity was confirmed in this population group in rural settings, at different ages, with the following frequencies: 18-21 years old - 3.8%, 22-44 years old - 35.8%, 45-59 years old - 37.2%, 60-74 years old - 22.0%, and ≥75 years old - 1.2%, with the detection of this comorbidity increasing with age to 34.6% (P<0.05).

A similar trend was observed in the local population; significantly higher frequencies of CC were confirmed in aboriginals aged 22-44 and 45-59 years old.

However, in contrast, according to our results, regional characteristics are evident in the formation of chronic bronchial obstruction comorbidity in rural women of different ages (Table 2, Figure 2).

Table 2 Features of the prevalence and formation of comorbid background of chronic bronchial obstruction in a population of rural women of different ages

Comorbid diseases, rural population, ≥ 15-75 years	Control groups, age										RR	95 %CI		χ ²	P
	18 - 21		22 – 44		45 – 59		60 - 74		≥ 75						
	n	%	n	%	n	%	n	%	n	%					
CHD	2	2,2	30	33,7	34	38,2	22	24,7	1	1,1	1,14	0,78	1,68	0,48	0,489
CHF	1	1,7	20	33,3	28	46,7	9	15,0	2	3,3	1,15	0,7	1,89	0,32	0,574
GD	3	4,6	23	35,4	23	35,4	16	24,6	0	0,0	0,98	0,62	1,54	0,01	0,933
GP	0	0,0	8	40,0	4	20,0	7	35,0	1	5,0	0,9	0,37	2,18	0,06	0,814
Pneumonia	6	6,8	32	36,4	31	35,2	17	19,3	2	2,3	0,83	0,57	1,2	1	0,317
T2DM	0	0,0	13	38,2	15	44,1	6	17,6	0	0,0	1,06	0,55	2,05	0,03	0,871
CA	2	5,3	13	34,2	12	31,6	10	26,3	1	2,6	0,96	0,51	1,79	0,02	0,895
Total	14	3,6	139	35,3	147	37,3	87	22,1	7	1,8					

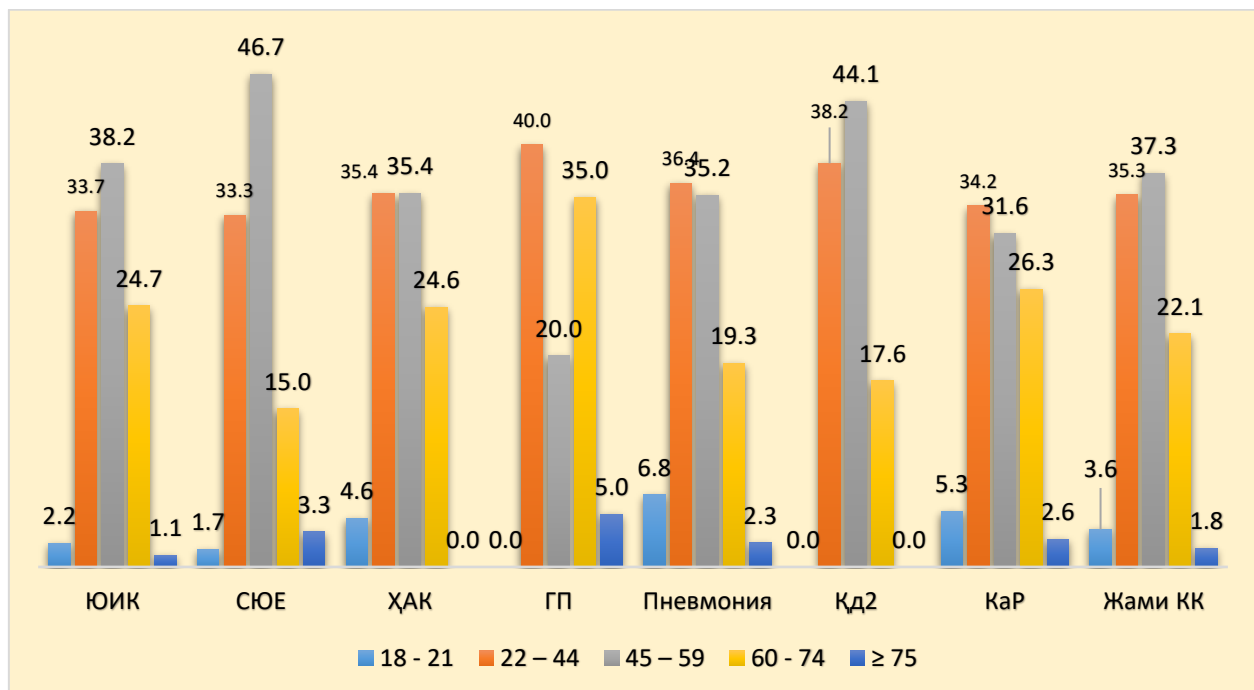


Figure 2. Expression of the formation of comorbidity background depending on age in the population of rural women with SBO.

For example, the prevalence of IHD was confirmed by the detection of 2.2% (18-21 years), 33.7% (22-44 years), 38.2% (45-59 years), 24.7% (60-74 years) and 1.1% (≥ 75 years) [RR=1.14; 95% CI=0.78-1.68; $X^2=0.48$; $P=0.489$].

In SBO, the prevalence of chronic heart failure was recorded in these age groups with a prevalence of 1.7%, 33.3%, 46.7%, 15.0% and 3.3%, respectively [RR=1.15; 95% CI=0.7-1.89; $X^2=0.32$; $P=0.574$]. In a population of rural women aged 18-21, the prevalence of HAC comorbidity with SBO was 4.6%; in the 22-44 and 45-59, 60-74 and ≥ 75 years old groups, it was confirmed at 35.4%, 35.4%, 24.6% and 0.0%, respectively [RR=0.98; 95% CI=0.62-1.54; $X^2=0.01$; $P=0.933$].

The highest frequency of glomerulopathy comorbidity was observed in the age group of 22-44 years (40.0%), 45-59 years (20.0%), and 60-74 years (35.0%). It was not detected in the age group of 18-21 years and was recorded in no more than 5.0% in the age group of ≥ 75 years [RR=0.9; 95% CI=0.37-2.18; $X^2=0.06$; $P=0.814$].

The incidence of pneumonia in SBO was observed in different age groups - 6.8% (18-21), 36.4% (22-44), 35.2% (45-59), 19.3% (60-74), and 2.3% (≥ 75) [RR=0.83; 95% CI=0.57-1.2; $X^2=1$; $P=0.317$].

Table 3 Features of the prevalence and formation of comorbid background of chronic bronchial obstruction in a rural male population of different ages

Comorbid diseases rural population, ≥ 18 – 75 years	Control groups, age										RR	95 %CI		χ ²	P
	18 - 21		22 – 44		45 – 59		60 - 74		≥ 75			min	max		
	n	%	n	%	n	%	n	%	n	%					
CHD	1	3,0	14	42,4	9	27,3	9	27,3	0	0,0	0,85	0,46	1,57	0,28	0,595
CHF	0	0,0	11	36,7	14	46,7	5	16,7	0	0,0	1,22	0,62	2,4	0,32	0,569
GD	0	0,0	14	46,7	11	36,7	5	16,7	0	0,0	0,81	0,42	1,55	0,42	0,516
GP	1	7,1	3	21,4	5	35,7	5	35,7	0	0,0	1,76	0,57	5,4	1,02	0,312
Pneumonia	5	13,5	11	29,7	13	35,1	8	21,6	0	0,0	0,93	0,52	1,65	0,07	0,792
T2DM	1	5,0	6	30,0	9	45,0	4	20,0	0	0,0	1,31	0,55	3,12	0,37	0,541
CA	0	0,0	7	46,7	5	33,3	3	20,0	0	0,0	0,81	0,31	2,12	0,19	0,662
Total	8	4,5	66	36,9	66	36,9	39	21,8	0	0,0					

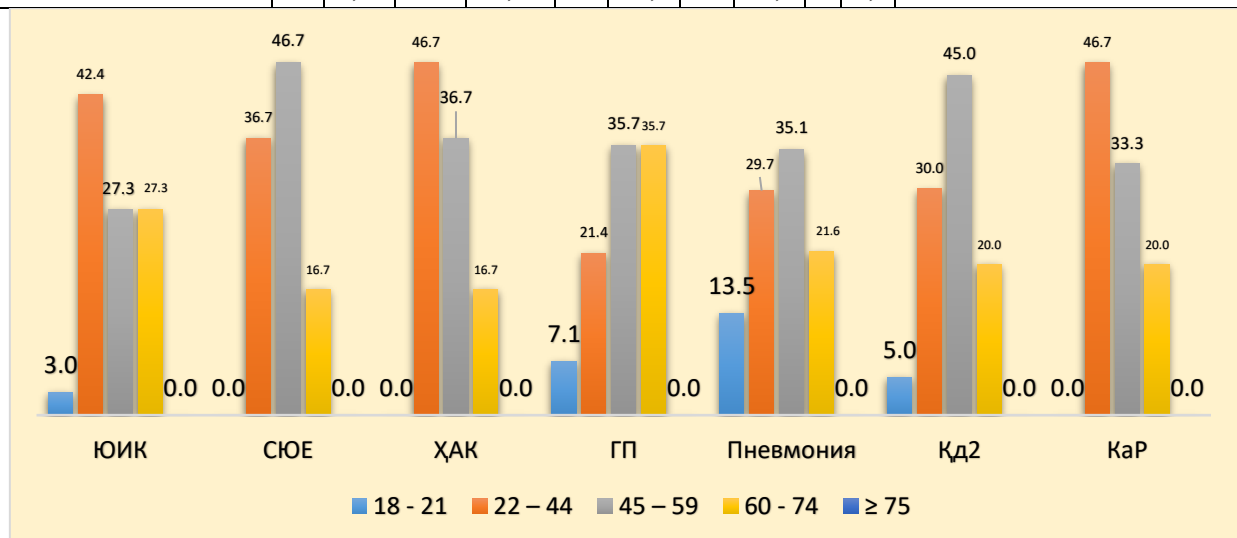


Figure 3. Expression of the formation of comorbidity background depending on age in the population of rural men with SBO.

The prevalence and incidence of CVD2 as a comorbidity in the SBO population of rural women of different ages were confirmed by the following determinations: 18-21 years old - 0.0%, 22-44 - 38.2%, 45-59 - 44.1%, 60-74 - 17.6% and ≥ 75 - 0.0% [RR=1.06; 9.5-2.05; X²=0.03; P=0.871].

The incidence of cardioarrhythmia comorbidity in this population was 5.3%, 34.2%, 26.3% and 2.6% in different age groups, respectively [RR=0.96; 95% CI=0.51-1.79; X²=0.02; P=0.895].

The prevalence of comorbid diseases in SBO is highest in the rural female population - in the 22-44, 45-59 and 60-74 age groups (35.3%, 37.3% and 22.1%, respectively), with lower rates in the 18-21 age group (3.6% and ≥ 75 years of age (1.8%).

The prevalence of chronic bronchial obstruction comorbidity in rural men of different ages was confirmed as follows: 1) COPD comorbidity - 3.0% in 18-21 years old, 42.4% in 22-44 years old, 27.3% in 45-59 years old, 27.3% in 60-74 years old and 0.0% in ≥ 75 years old [RR=0.85; 95% CI=0.46-1.57; X²=0.28; P=0.595]; 2) CUE+SBO comorbidity: 0.0%, 36.7%, 46.7%, 16.7% and 0.0%, respectively [RR=1.22; 95% CI=0.62-2.4; X²=0.32; P=0.569]; 3) HAK comorbidity - 0.0%, 46.7%, 36.7%, 16.7% and 0.0% [RR=0.81; 95% CI=0.42-1.55; X²=0.42; P=0.516]; 4) GP comorbidity - 7.1%, 21.4%, 35.7%, and 0.0% [RR=1.76; 95% CI=0.57-5.4; X²=1.02; P=0.312]; 5) Pneumonia comorbidity - 13.5%, 29.7%, 35.1%, 21.6% and 0.0% [RR=0.93; 95% CI=0.52-1.65; X²=0.07; P=0.792]; 6) QD2 comorbidity - 5.0%, 30.0%, 45.0%, 20.0% and 0.0% [RR=0.81; 95% CI=0.31-2.12; X²=0.19; P=0.662]; 7) comorbidity of cardioarrhythmias and SBO: in 18-21-year-olds - 4.5%, in 22-44 - 36.9%, in 45-59 - 36.9%, in 60-74 - 21.8% and in ≥ 75 - 0.0% [RR=0.81; 95% CI=0.31-2.12; X²=0.19; P=0.662].

The prevalence of all comorbid diseases forming a comorbid background for chronic bronchial obstruction in the rural male population was characterized as 4.5% (18-21 years old), 36.9% (22-44 years old), 36.9% (45-59 years old), 21.8% (60-74 years old) and 0.0% (≥ 75 years old).

Based on the results of the study, the first socio-economic and medically effective prevention program was created and implemented for valley conditions, taking into account the epidemiological characteristics of chronic bronchial obstruction, risk factors, comorbid background, emergency care and regional characteristics at the population level.

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Based on the results of the study, the first socio-economic and medically effective prevention program for valley conditions, taking into account the epidemiological characteristics of chronic bronchial obstruction, risk factors, comorbidity background, regional characteristics of emergency care and the population level, was created and put into practice. This first-ever developed and implemented "RAA Algorithm-Prevention Program" is effective in reducing socio-economic and medical losses from COPD in valley conditions: 1) Early detection of diseases associated with COPD increases by up to 50% among the population; 2) It allows to increase the level of early diagnosis of COPD by 100%; 3) It has been proven that it can reduce the risk of complications (death) of COPD by 100% (in rural conditions) and by 50% (in emergency medical care centers).

Conclusion

Almost every second (49.5%) rural population with chronic bronchial obstruction has comorbid diseases (coronary heart disease (CHD), chronic heart failure (CHF), digestive diseases (GD), glomerulopathies (GP), pneumonia, type 2 diabetes mellitus (T2DM) and cardioarrhythmias (CA).

Comorbid diseases are characterized by a frequency of 68.8% in women with CVO and 31.2% in men, with an 11.9-fold increase in age-related diseases.

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Mualliflar haqida

Toshmatov Baxtiyor Asqaralievich - Respublika shoshilinch tibbiy yordam ilmiy markazi Andijon filiali Ultratovush shifokori (ORCID:0000-0001-7092-0003); +998973380044 mail: Bakhtiyor.toshmatov.89@gmail.com

Mamasaliev Nematjon Solievich - Andijon davlat tibbiyot instituti vrachlar malakasini oshirish va qayta tayyorlash fakulteti ichki kasalliklar, kardiologiya va shoshilinch tibbiy yordam kafedrasini mudiri, t.f.d., professor (ORCID: 0000-0002-5013-9647); +998906258346; mail: prof.mamasoliev.ns@mail.ru.

Tursunov Xatam Xasanbaevich- Andijon davlat tibbiyot instituti vrachlar malakasini oshirish va qayta tayyorlash fakulteti ichki kasalliklar, kardiologiya va shoshilinch tibbiy yordam kafedrasini professor (ORCID: 0000-0002-1780-6911); +998 91 483 87 59; mail: dr_hatam.tursunov59@mail.ru.

Mamasaliev Zohidjon Nematovich– Andijon davlat tibbiyot instituti oftalmologiya kafedrasini dotsenti (ORCID: 0000-0002-0965-1104); +998 90 169 70 07; mail: zohidmamasoliev177@mail.com.

Usmonov Burhonjon Umarovich- O‘zbekiston Andijon davlat tibbiyot instituti vrachlar malakasini oshirish va qayta tayyorlash fakulteti ichki kasalliklar, kardiologiya va shoshilinch tibbiy yordam kafedrasini dotsenti (ORCID:0000-0001-7092-0003); +998941000083 mail: usmonovburxon1977@gmail.com.

Контактное лицо- Усмонов Б.У.

Телефон: +998941000083

E-mail- usmonovburxon1977@gmail.com