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COMMUNITY-ACQUIRED PNEUMONIA AND CHRONIC HEART FAILURE

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ABSTRACT

The purpose of the study. To evaluate the effect of community-acquired pneumonia (IBD) on the short- and long-term prognosis in patients hospitalized with decompensation of chronic heart failure (CHF).

Materials and methods. Cases of hospitalization (n=71) in a hospital according to the profile therapy /cardiology of patients with
CHF decompensation phenomena for 1 year.

Results. Among patients hospitalized with CHF decompensation, the prevalence of IBD was 16.5%. This indicator did not depend on the age of the patients. From the combined pathology, arterial hypertension, various forms of coronary heart disease, diabetes mellitus, and chronic obstructive pulmonary disease were more often noted in patients with IBD. The presence of IBD in a patient with decompensated CHF significantly increased the length of hospital stay (13.1 days versus 11.9 days; p=0.009), as well as the probability of re—hospitalization within a year (odds ratio - OR 1.9; p=0.02). The presence of IBD in a patient with decompensated CHF led to an increase in mortality (OR 13.5; p <0.001), and the maximum probability of death was noted on the 1st day
of hospitalization (12.7%). The risk of death during the year of follow-up in patients hospitalized with decompensation of CHF and concomitant pneumonia was higher (OR 4.8; p<0.001) than in patients without pneumonia.

Conclusion. IBD in a patient with decompensated CHF significantly worsens the prognosis for both short-term and long-term mortality, increases the risk of re-hospitalization and increases the duration of the patient's stay in the hospital.

Keywords: clinical epidemiology, community-acquired pneumonia, decompensation of CHF, prevalence, mortality, short-term prognosis, long-term prognosis.

INTRODUCTION

Community-acquired pneumonia (CAP) is an important risk factor that worsens the prognosis in patients with cardiovascular diseases (CVD). There are scientifically substantiated theories of the influence of acute respiratory tract disease on various stages of the cardiovascular continuum due to the activation of systemic and local inflammation, increased activity of the blood clotting system, provocation of endothelial dysfunction, pathophysiological changes in hemodynamics in response to an inflammatory reaction, as well as direct exposure of infectious pathogens to atherosclerotic plaque. In the Republic of Uzbekistan, chronic heart failure (CHF) of functional class I—VI (FC) occurs in 7%, and CHF III—IV FC — in 2.1% of the country's population. In almost every second (49%) patient hospitalized in the cardiology department, the cause is decompensation of CHF, and among all patients with CVD, it causes hospitalization in 16.8%.

Annual mortality among patients with CHF is significantly higher than in the population (odds ratio — OR 10.3), and among patients with clinically pronounced CHF III—IV FC this figure reaches 12%. Morbidity pneumonia in Uzbekistan in 2006 amounted to 4.1% of cases among all age groups, and the mortality rate for this disease is 27.3 cases per 1000 population.

In the recommendations for the diagnosis and treatment of CHF The American Heart Association noted that pneumonia can lead to decompensation of CHF by increasing the level of natriuretic peptide.

According to clinical and population studies, the incidence of pneumonia with decompensation of CHF varies from 8.7 to 43.1%, and the main etiological cause of such pneumonia in Uzbekistan according to the registry is pneumococcus (51% of cases).

According to V. Corrales-Medina et al., among patients who developed pneumonia, cardiovascular complications were observed in 26.7% of patients, among whom 66.8% had heart failure.

In some groups of individuals, the mortality from pneumonia varies. According to the results of J. Metlay 's research, The OR for death in a patient with pneumonia with concomitant CHF is 2.4 (with a 95% confidence interval — CI from 2.2 to 2.5), which is higher than in patients with immunodeficiency conditions (OR 1.6 with 95% CI from 1.3 to 1.8) and diabetes mellitus (OR 1.2 with 95% CI from 1.1
to 1,4). With the development of pneumonia in patients with CHF, mortality depends on the presence of combined CVD. Thus, patients with atrial fibrillation (AF), valve pathology and myocardial infarction (MI) have the greatest risk of death within 90 days from the moment of hospitalization for pneumonia. According to R. Thomsen et

al., the risk of death increases with increasing severity of CHF and is especially high if, during hospitalization, the patient requires the appointment of loop diuretics in combination with spironolactone (CHF III—IV FC according to NYHA), but the highest risk was found in patients with CHF,
who did not receive basic therapy for this disease before hospitalization.
Thus, the development of pneumonia in a patient with CHF is a factor that significantly worsens his prognosis.
The aim of the work was to assess the impact of IBD on the short- and long-term prognosis in patients hospitalized with decompensation of CHF.

MATERIALS AND METHODS

The formed committee of experts carried out an analysis
of each clinical case in order to identify signs of progression of CHF. The study selected patients who had acute manifestations of decompensation of cardiac
activity, regardless of the reasons for hospitalization, and who needed intravenous administration of loop diuretics on the 1st day.
The total number of examined clinical cases was 448. Of these, 71 (15.8%) cases showed signs of decompensation of CHF. In a specially designed for research
the primary documentation recorded biometric and clinical data, diagnosis at admission and discharge, inpatient therapy, noted the fact of appointment of laboratory and instrumental studies, recorded the outcome of hospitalization.
When processing data, the Student's criterion t was used for statistical hypothesis testing in the case of parametric data distribution and the criterion $\chi 2$ in the case of nonparametric. The survival analysis was performed using the StatSoft Statistica 10.0 application software package. Statistically significant differences were considered at $p<0.05$.

RESULTS and DISCUSSION

The prevalence of pneumonia among patients with decompensated CHF was 16.5%, while this disease was statistically significantly more common in men than in women (22.7 and 12.1%, respectively; $p<0.001$).
We conducted an age-related analysis of the prevalence of pneumonia among patients of the studied group. The prevalence of pneumonia was minimal (8.3%)
in the group of patients aged 40-49 years. With increasing age, the prevalence of pneumonia did not significantly increase and amounted to 16.4% in the age group of 50-59 years, 11.9% in the group of 60-69 years, in the group of 70— 79 years, 18% in the group of 80-89 years and 11.1% in the group of 90-99 years. We found no

statistically significant differences (p>0.05) between the prevalence of pneumonia depending on age. When dividing the obtained sample, depending on age, into subgroups younger than 60 and 60 years and older, the prevalence of pneumonia was 16% in the first subgroup and 16.6% in the second (p=0.90).

The results of the analysis of the prevalence of pneumonia among patients with decompensated CHF, depending on gender and age. The differences by sex were maximal in the age group of 70-79 years — 2.6:1 (p<0.001). The results of the analysis of concomitant pathology in patients with decompensated CHF in order to identify potential factors contributing to the development of pneumonia. Among patients with decompensation CHF in the structure of combined diseases, hypertension, permanent form of AF, DM, post-infarction cardiosclerosis and ICMP, clinically pronounced forms of coronary heart disease, DCMP, COPD were comparatively common. Statistically significantly more often with the development of pneumonia among the combined There were DCM (OR 2.1; p=0.002) and hospitalization with acute heart failure (OR 2.1; p<0.001). In the groups with and without pneumonia, the prevalence of COPD (20.2 and 17.1%, respectively; p=0.41) and bronchial asthma (1.6 and 3%, respectively; p=0.38) was comparable and did not differ statistically significantly.

We did not find a significant increase in the incidence of pneumonia in patients with systolic dysfunction. Among patients with ejection fraction (EF) <35%, the incidence of pneumonia was 8.2%, then as in patients with preserved PV 12.8% (p=0.27).

Table 1. Structure of combined pathology in decompensation of CHF in patients with and without pneumonia

Factor	Prevalence, %		p
	there is no pneumonia	there is pneumonia	
History of hypertension	78.9	73.4	0.17
Permanent form of AF	37.2	33.1	0.38
Paroxysmal form of AF	9.3	8.9	0.89
ONMC in anamnesis	6.4	9.7	0.19
SD	33.5	24.2	0.006
Postinfarction cardiosclerosis	**33.2**	**36.3**	**0.51**
ICMP	41,2	29,0	0,01
Cardiac asthma or pulmonary edema	17.9	31.5	<0.001
Heart defects	11.5	9.7	0.56
Clinically manifested forms of coronary heart disease	86.9	74.2	<0.001
DCMP	13.3	24.2	0.002
Cardits	0.6	1.6	0.27

PE	1.4	1.6	0.88
COPD	17.1	20.2	0.41
Bronchial asthma	3.0	1.6	0.38
Pulmonary hypertension	2.2	4.0	0.24
Pulmonary heart	1.6	0.8	0.50
CPN	18.8	23.4	0.24

Note. AH — arterial hypertension; ONMC — acute cerebrovascular accident; DM — diabetes mellitus; ICMP— ischemic cardiomyopathy; CHD — ischemic heart disease; DCMP — dilated cardiomyopathy; PE — pulmonary embolism; COPD — chronic obstructive pulmonary disease; CRF — chronic renal failure.

Table 2. Age-related mortality among patients with decompensated CHF, depending on the presence of pneumonia

Factor	Prevalence, %		p
	there is no pneumonia	there is pneumonia	
50-59 years old	9.1	0	
60-69 years old	28.6	1.9	<0.001
70-79 years old*	27.6	1.6	<0.001
80-89 years old	30	5.1	<0.001

Note. * — for differences compared to the group of 60-69 years, p = 0.44, compared to the group of 80-89 years, p = 0.13.

The average length of hospital stay in patients with pneumonia was 13.1±4.2 days, and in patients without pneumonia — 11.9±3.3 days (p=0.009), while (p=0.12) the length of hospital stay in patients with pneumonia did not significantly differ in men (12.5±4.1 days) and women (13.9±4.2 days). During the year, the frequency of repeated hospitalizations in patients with pneumonia on the background of CHF decompensation (45.6%) was statistically significantly higher than without pneumonia (30.4%; OR 1.9 at 95% CI from 1.1 to 3.4; p=0.02).

Mortality among patients with CHF decompensation without pneumonia, it was 2.7%, whereas with the addition of pneumonia it increased to 27.4% (OR 13.5; p <0.001). In the presence of pneumonia, the mortality rate among men was 25.4%, and among women — 30.2% (due to insufficient sampling, we did not get statistically significant differences in this indicator between the sexes: OR 1.3; p= 0.55). If pneumonia was not detected, the frequency of deaths in the hospital was significantly lower (3.3% among men and 2.3% among women; OR for sex differences was the same — 1.4; p =0.47).

Thus, mortality is statistically significantly higher among men and women who have pneumonia, compared with similar subgroups without pneumonia: OR 8.8 and 18.0 in men and women, respectively (p<0.001).

Mortality among patients with decompensated CHF and pneumonia was the highest on the 1st day from the moment of hospitalization - 12.7% of patients from the entire group with a diagnosis of pneumonia died, and in the group without pneumonia only 1.1% (OR 11.3 at 95% CI from 4.4 to 28.5; p<0.001). Kaplan—Meyer survival curves for mortality depending on the presence of pneumonia are presented.We conducted an age-by-age analysis of mortality among patients with decompensation of CHF in combination with and without pneumonia (Table 2).

The frequency of deaths in hospital among patients with decompensation of CHF in combination with pneumonia was 9.1% in the age group from 50 to 59 years. We have not identified a single case of death among patients without pneumonia in this age group. In older age groups, mortality in patients with pneumonia remained stably the same and did not significantly differ statistically between the groups (p>0.05), amounting to 28.6% in the 60-69 age group, 27.6% in the 70-79 age group and 30% in the 80-89 age group. In the same age groups The mortality rate among patients without pneumonia was significantly lower and was 1.9% (OR 20.3; p<0.001), 1.6% (OR 24.2; p<0.001) and 5.1% (OR 8.0; p<0.001), respectively. The frequency of deaths did not statistically differ with increasing age both among patients with pneumonia and among those who did not have it.

According to the assessment of the long—term prognosis in patients with decompensated CHF, depending on the presence of pneumonia, during the study period, mortality in the group of patients with pneumonia was 54.4%, and among patients without pneumonia - 19.9% (OR 4.8 with 95% CI from 2.9 to 8.0; p<0.001).

The prevalence of IBD among patients with decompensated CHF in our sample is extremely high: in fact, it is noted in every 6th patient. The high prevalence of pneumonia among patients with decompensated CHF (5-9%) is also noted according to the results of analysis in foreign registers (OPTIMIZE-HF, EHFS II, ADHERE, etc.), as well as in the Uzbekistan ORACLE-RF study, which evaluated the prognosis in patients with decompensated CHF: the prevalence of pneumonia among patients with CHF reached 31%. The results obtained by us indicate that the prevalence of IBD is comparable in different age groups. Moreover, there were no statistically significant differences in the subgroups younger and older than 60 years. Thus, the incidence of IBD in patients with decompensated CHF is most likely independent of age, whereas in the general population, the incidence of pneumonia is directly dependent on it.

The analysis of the combined pathology in patients with decompensation of CHF showed that with the development of pneumonia in patients, DCMP and the phenomena of acute decompensation of blood circulation in the small circulatory circle (cardiac asthma or pulmonary edema) are significantly more common. This suggests that with this combination of conditions in the lungs, hemodynamic conditions are formed that contribute to the development of lung inflammation.

The average length of hospital stay and the probability of re-hospitalization of patients pneumonia on the background of decompensation of CHF were higher than patients without pneumonia. In the OPTIMIZE-HF register, the presence of pneumonia or respiratory disease in a patient with decompensated CHF led to an increase in the length of hospital stay by 1.08 times ($p<0.001$).

In the presence of pneumonia, mortality among patients with decompensated CHF increases statistically significantly. A similar trend was shown in the ORACLE-RF study: according to multivariate analysis, pneumonia in a patient with decompensated CHF increased the relative risk of a fatal outcome by 1.22 times, which turned out to be comparable with such combined diseases as cirrhosis of the liver (HR 1,15), chronic kidney disease (HR 1,19) and atrial fibrillation (HR 1,24).

With all the described combinations of diseases, the annual mortality rate among patients approached 50%. In the OPTIMIZE-HF register, the standardized mortality rate was the highest among patients with pneumonia and decompensation of CHF compared to other combined conditions, amounting to 1.60 (with 95% CI from 1.38 to 1.85; $p<0.001$).

In our study, both men and women the risk of death with pneumonia on the background of decompensation of CHF was higher than with decompensation of CHF without pneumonia. However, sex differences in mortality among patients with pneumonia turned out to be statistically unreliable (insufficient statistical power of the sample). Most likely, among patients with decompensation CHF mortality in the presence of pneumonia does not differ in age groups, while remaining at a high level, exceeding mortality by several times compared with that in patients without pneumonia. The maximum risk of death in patients with decompensation of CHF and pneumonia was detected on the 1st day from the moment of hospitalization.

It is logical to assume that the prevention of respiratory infections in patients with high risk of development CVD will significantly improve the prognosis, however, studies completed to date present ambiguous data regarding the results of pneumococcal vaccination. The cohort study of H. Tseng et al. did not reveal the benefits of vaccination in relation to the prevention of ONMC and acute MI: OR 1.09 and 1.14, respectively. In study A. Siriwardena et al. The risk of MI development in

vaccinated patients was 0.96. Studies on vaccination of patients at high risk of developing CVD have not been conducted randomized and placebo-controlled, were performed using polysaccharide rather than conjugated vaccines, which could affect the results obtained. Moreover, there are currently no prospective randomized and placebo-controlled studies to assess the effectiveness of vaccination of pneumococcal pneumonia among patients with CHF. Nevertheless, in order to reduce the risk of developing CVD, the Recommendations for the diagnosis and treatment of CHF adopted in Uzbekistan, the USA, and Europe require vaccination of patients with CHF from acute respiratory diseases and pneumonia viruses.

CONCLUSION

The development of pneumonia in a patient with decompensation CHF significantly worsens the prognosis for both short-term and long-term mortality, increases the risk of re-hospitalization and increases the length of the patient's stay in the hospital.

LITERATURE

1. Jamshedovna, K. D., Alisherovna, K. M., Davranovna, M. K., & Xudoyberdiyevich, G. X. (2022). Epidemiology And Features Of Essential Therapy Hypertension In Pregnant Women. *Web of Scientist: International Scientific Research Journal*, *3*(5), 606-611.
2. Jamshedovna, K. D., Alisherovna, K. M., Erkinovna, K. Z., & Davranovna, M. K. (2022). LEFT VENTRICULAR SYSTOLIC DYSFUNCTION IN PREGNANT WOMEN WITH PRE-ECLAMPSIA WITHOUT PROTEINURIA. *Spectrum Journal of Innovation, Reforms and Development*, *10*, 135-140.
3. Khusainova, M. A. (2023). CYSTATIN C IS AN EARLY MARKER OF DECREASED KIDNEY FUNCTION. *Oriental renaissance: Innovative, educational, natural and social sciences*, *3*(1), 485-490.
4. Khusainova, M. A., Gafforov, K. K., Uzokov, J. B., & Tairova, Z. K. (2023). THE CHANGE IN THE QT INTERVAL IS A MARKER OF THE SEVERITY OF LIVER CIRRHOSIS. *Oriental renaissance: Innovative, educational, natural and social sciences*, *3*(2), 94-101.
5. Khusainova, M. A., Gafforov, K. K., Uzokov, J. B., & Tairova, Z. K. (2023). THE CHANGE IN THE QT INTERVAL IS A MARKER OF THE SEVERITY OF LIVER CIRRHOSIS. *Oriental renaissance: Innovative, educational, natural and social sciences*, *3*(2), 94-101.
6. Khusainova, M. A., Khaydarov, S. N., Uzokov, J. B., & Karabayeva, G. K. (2023). KIDNEY CONDITION IN PATIENTS WITH CHRONIC HEART

FAILURE. *Oriental renaissance: Innovative, educational, natural and social sciences*, *3*(2), 102-112.

7. Khusainova, M. A., Khaydarov, S. N., Uzokov, J. B., & Shonazarova, N. K. (2023). QUALITY OF LIFE IN PATIENTS WITH CHOLELITHIASIS IN THE LONG-TERM PERIOD AFTER CHOLECYSTECTOMY. *Oriental renaissance: Innovative, educational, natural and social sciences*, *3*(2), 231-239.
8. Nizamitdinovich, K. S., & Alisherovna, K. M. (2022). Quality of Life in Patients with Chronic Heart Failure, After Cardiac Resynchronization Therapy. *Texas Journal of Medical Science*, *14*, 168-173.
9. Palvanovna, K. Z., & Muxtorovna, E. M. (2022). THE PREVALENCE OF LESIONS OF THE DISTAL BRONCHIAL TREE (BRONCHIOLITIS) IN PATIENTS WITH RHEUMATOID ARTHRITIS. *Galaxy International Interdisciplinary Research Journal*, *10*(5), 1044-1051.
10. Rustamovich, T. D., Alisherovna, K. M., Baxtiyorovich, U. J., & Abdurakhmonovich, M. M. (2022). Painless Cardiac Ischemia in Women with Rheumatoid Arthritis. *Texas Journal of Medical Science*, *13*, 95-98.
11. Rustamovich, T. D., Alisherovna, K. M., Djamshedovna, K. D., & Nizamitdinovich, K. S. (2023). Features of the Psychoemotional Status of Patients with Rheumatoid Arthritis. *Miasto Przyszłości*, *32*, 23-30.
12. Rustamovich, T. D., Alisherovna, K. M., Nizamitdinovich, K. S., & Djamshedovna, K. D. (2022). Gastrointestinal Conditions in Rheumatoid Arthritis Patients. *Texas Journal of Medical Science*, *15*, 68-72.
13. Shodikulova, G. Z., Samatov, D. K., Gulomov, J. I. U., & Atoev, T. T. (2022). Evaluation of Endothelial Function and Connective Tissue Metabolism in Patients with Upper Git Pathology on the Background of Connective Tissue Dyplasia. *Telematique*, 6874-6880.
14. Toshtemirovna, E. M. M., Alisherovna, K. M., Erkinovna, K. Z., & Xudoyberdiyevich, G. X. (2022). DIAGNOSIS OF CIRRHOTIC CARDIOMYOPATHY. *Spectrum Journal of Innovation, Reforms and Development*, *10*, 141-147.
15. Toshtemirovna, E. M. M., Alisherovna, K. M., Totlibayevich, Y. S., & Xudoyberdiyevich, G. X. (2022). Anxiety Disorders and Coronary Heart Disease. *The Peerian Journal*, *11*, 58-63.
16. Toshtemirovna, E. M. M., Alisherovna, K. M., Totlibayevich, Y. S., & Muxtorovna, E. M. (2022). Hearts In Rheumatoid Arthritis: The Relationship With Immunological Disorders. *Spectrum Journal of Innovation, Reforms and Development*, *4*, 34-41.

17. Toshtemirovna, E. M. M., Alisherovna, K. M., Totlibayevich, Y. S., & Duskobilovich, B. S. (2022). THE VALUE OF XANTHINE IN CHRONIC HEART FAILURE. *Spectrum Journal of Innovation, Reforms and Development*, *4*, 24-29.
18. Xudoyberdiyevich, G. X., Alisherovna, K. M., Toshtemirovna, E. M., & Jamshedovna, K. D. (2022). Features of portal blood circulation and echographic structure of the liver in patients with chronic heart failure. *Web of Scientist: International Scientific Research Journal*, *3*(5), 576-581.
19. Xudoyberdiyevich, G. X., Alisherovna, K. M., Toshtemirovna, E. M. M., & Totlibayevich, Y. S. (2022). Characteristics Of Neuropeptides-Cytokines in Patients with Cardiovascular Pathology Occurring Against the Background of Anxiety and Depressive Disorders. *The Peerian Journal*, *11*, 51-57.
20. Zikiryayevna, S. G., Muxtorovna, E. M., Jurakulovich, U. I., & To'raqulovna, Q. S. (2022). PAINLESS CARDIAC ISCHEMIA IN WOMEN WITH RHEUMATOID ARTHRITIS. *Web of Scientist: International Scientific Research Journal*, *3*(10), 397-405.
21. Zikiryayevna, S. G., Zohirovna, M. G., Muxtorovna, E. M., & Bahromovich, S. S. (2022). Kidney Damage in Patients with Chronic Cardiac Insufficiency and Obesity. *Texas Journal of Medical Science*, *13*, 72-78.
22. Zikriyaevna, S. G. (2017). Special features of clinical and functional disorders in patients with undifferentiated connective tissue dysplasia. *European science review*, (3-4), 72-74.
23. Ибадова, О. А., & Шодикулова, Г. З. (2022). ОЦЕНКА ПРОГНОСТИЧЕСКОЙ ЗНАЧИМОСТИ ИНТЕНСИВНОСТИ И ЧАСТОТЫ КАШЛЯ У ПАЦИЕНТОВ С ИНТЕРСТИЦИАЛЬНЫМ ПОРАЖЕНИЕМ ЛЕГКИХ. *Журнал кардиореспираторных исследований*, *3*(2).
24. Ибадова, О. А., Аралов, Н. Р., & Курбанова, З. П. (2020). Роль сурфактантного белка D (SP-D) в иммунном ответе при неспецифической интерстициальной пневмонии. *Достижения науки и образования*, (4 (58)), 45-49.
25. Ибадова, О. А., Курбанова, З. П., & Шодиев, О. О. (2021). ФАКТОРЫ РИСКА В ПРОГРЕССИРОВАНИИ НЕСПЕЦИФИЧЕСКОЙ ИНТЕРСТИЦИАЛЬНОЙ ПНЕВМОНИИ. *Достижения науки и образования*, (8 (80)), 101-107.
26. Ибадова, О. А., Шодикулова, Г. З., & Нажмиддинов, А. Ш. (2021). ТРУДНОСТИ ДИФФЕРЕНЦИАЛЬНОЙ ДИАГНОСТИКИ НЕСПЕЦИФИЧЕСКОЙ ИНТЕРСТИЦИАЛЬНОЙ ПНЕВМОНИИ. *Достижения науки и образования*, (8 (80)), 50-55.

27. Ибадова, О., Махматмурадова, Н., & Курбанова, З. (2020). ПОТЕНЦИАЛЬНЫЕ ФАКТОРЫ РИСКА В РАЗВИТИИ И ПРОГРЕССИРОВАНИИ НЕСПЕЦИФИЧЕСКОЙ ИНТЕРСТИЦИАЛЬНОЙ ПНЕВМОНИИ. *Журнал кардиореспираторных исследований*, *1*(1), 72-76.
28. Назаров, Ф. Ю., & Ярмухамедова, С. Х. (2022). Медико-социальные аспекты профилактики среди студенческой молодежи в условиях пандемии COVID-19. *Science and Education*, *3*(12), 256-263.
29. Таирова, З. К., & Шодикулова, Г. З. (2022). RISK FACTORS AND FEATURES OF CORONARY HEART DISEASE IN PATIENTS WITH RHEUMATOID ARTHRITIS. *ЖУРНАЛ БИОМЕДИЦИНЫ И ПРАКТИКИ*, *7*(6).
30. Эргашова, М. М., & Шодикулова, Г. З. (2021). Ревматоид Артрит Ва Иккиламчи Остеоартроз Касаллиги Бор Беморларда Юрак Гемодинамикасининг Ўзига Хос Хусусиятлари. *Журнал Биомедицины И Практики*, *6*(1).
31. Ярмухамедова, С. Х. (2016). Структурно-функциональное состояние правого желудочка у больных артериальной гипертензией. *Национальная ассоциация ученых*, (1 (17)), 17-17.
32. Ярмухамедова, С. Х., & Исмоилова, М. Ш. (2019). Изучение особенностей ремоделирования сердца на разных стадиях хронической сердечной недостаточности у больных постинфарктным кардиосклерозом и дилатационной кардиомиопатией. *Достижения науки и образования*, (12 (53)), 81-83.
33. Ярмухамедова, С. Х., Норматов, М. Б., & Вафаева, Н. А. (2020). Особенности суточного профиля артериального давления у больных хроническим гломерулонефритом. *Достижения науки и образования*, (11 (65)), 69-72.