



# Severity and Prevalence in Non-Specific Interstitial Pneumonia and COVID-19 Associated Pneumonia

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## Abstract

**Background:** The non-specific clinical presentation and absence of definitive diagnostic markers further complicate the diagnosis of interstitial lung diseases (ILD), particularly idiopathic interstitial pneumonia (IIP). This study aimed to investigate the clinical and epidemiological characteristics, along with imaging diagnostics, of patients with non-specific interstitial pneumonia (NsIP) in the Samarkand region from 2020 to 2023. **Methods:** A retrospective analysis of medical records was conducted for 262 patients diagnosed with ILD and hospitalized at the Samarkand State Medical Association (SamSMA). Using a multidisciplinary approach and adhering to the international classification of diseases (ICD-10) criteria, patients were categorized into two groups: those diagnosed with NsIP and a comparison group of patients with COVID-19-associated pneumonia (COVID-19 AP). The patients were further subdivided based on disease severity: moderate (IA) and severe (IB) for the NsIP group, and moderate (IIA) and severe (IIB) for the COVID-19 AP group. **Results:** The study found that 72.5% of ILD patients had NsIP, predominantly older males. Moderate disease severity was more common in NsIP patients, while severe cases were more prevalent in the

COVID-19 AP group. The age groups 45-59 and 60-74 years represented 78% of the NsIP cases. **Conclusion:** The study found a higher prevalence of NsIP among men, with the majority of cases occurring in older age groups. Moderate disease severity was more common in NsIP patients, contrasting with COVID-19 AP patients, where severe cases were more prevalent.

**Keywords:** Non-Specific Interstitial Pneumonia, COVID-19 Associated Pneumonia, Interstitial Lung Disease, Epidemiology, Multidisciplinary Approach

## 1. Introduction

In 2019, global mortality reached 55.4 million, with non-communicable diseases accounting for 74% of these deaths. Among these, respiratory diseases persist as significant contributors, consistently ranking 3rd or 4th among the top causes of death worldwide (Avdeev et al., 2021). In Uzbekistan, respiratory diseases hold the 3rd position in mortality rankings, following cardiovascular diseases and neoplasms, and contribute to 6% of all deaths (data for 2023). Within the realm of respiratory conditions, idiopathic interstitial lung diseases (IIL) account for a notable portion, comprising 10-15% of the total lung disease burden (Avdeev, 2014; Anaev, 2017; Vershinina, 2013).

IIL encompasses a range of rare disorders with an estimated prevalence of 10-25 cases per 100,000 inhabitants. The incidence of these diseases escalates markedly after the age of 65 (Avdeev, 2014; Demura, Kogan, & Paukov, 2015; Xu et al., 2014). Prognosis varies significantly based on the underlying etiology, with conditions often categorized into those with known causes and those classified

**Significance** | This study showed a comprehensive analysis of epidemiological and clinical features of NsIP and COVID-19 AP, highlighting differences in severity and prevalence in the Samarkand region.

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as idiopathic interstitial pneumonia (IPI) (Dvoretzky, 2014; Dvoretzky, 2009; Zabozaev et al., 2020). Progressive pulmonary fibrosis is observed in 18-32% of patients with IIL (Avdeev et al., 2021; Tomassetti et al., 2016). These disorders are characterized by their unknown etiology, progressive respiratory failure, unproductive cough, and notable changes in lung function and imaging, including restrictive ventilation impairments and diffuse lung alterations visible on X-ray and CT scans (Sebastiani et al., 2020; Teoh & Corte, 2020).

Despite significant advances in understanding nonspecific interstitial pneumonia (NsIP) over the past two decades, diagnostic challenges remain (Vershina, 2013; Sebastiani et al., 2020). The diagnostic approach has evolved from a reliance on morphological verification to a multidisciplinary strategy that integrates inputs from clinicians, radiologists, rheumatologists, and, when necessary, morphologists (Avdeev et al., 2021; Zabozaev et al., 2020). This study aims to examine the epidemiological features, gender distribution, age-related patterns, clinical characteristics, and imaging diagnostics of patients with NsIP in the Samarkand region from 2020 to 2023.

## 2. Materials and Methods

### 2.1 Study Design and Setting

This study involved a comprehensive retrospective analysis of medical records from 262 patients diagnosed with interstitial lung disease (ILD) who were hospitalized at the Samarkand State Medical Association (SamSMA) between 2020 and 2023. The focus was on identifying patients with non-specific interstitial pneumonia (NsIP) and comparing their profiles with those diagnosed with COVID-19-associated pneumonia (COVID-19 AP).

### 2.2 Participants

The patient cohort comprised individuals hospitalized with various forms of ILD. To ensure accurate diagnosis and classification, a multidisciplinary team of pulmonologists, radiologists, pathologists, and other specialists was assembled. This team employed rigorous diagnostic criteria, adhering to the International Classification of Diseases, 10th Revision (ICD-10), and the American Thoracic Society (ATS)/European Respiratory Society (ERS) criteria (2002 revision, updated 2013) for ILD classification (ICD-10 J80-J84).

### 2.3 Inclusion and Exclusion Criteria

The study included patients with a confirmed diagnosis of non-specific interstitial pneumonia (NsIP) or COVID-19-associated pneumonia (COVID-19 AP), based on clinical, radiological, and histopathological findings. Patients with identifiable external causes of interstitial lung disease (ILD), such as exposure to medicinal agents or organic and inorganic dust, were excluded from the study. To provide baseline comparisons, a control group of 20 healthy individuals without ILD or COVID-19 AP was also included.

### 2.4 Data Collection

Data were collected from medical records, encompassing various aspects. Demographic information such as age, sex, and other relevant details was recorded. Clinical characteristics including symptoms, clinical presentation, and disease progression were documented. Radiological findings from chest X-rays and CT scans were reviewed. Available histopathological data from biopsies were included, along with laboratory findings covering relevant biomarkers and other test results. Treatment outcomes, including responses to treatment and overall patient outcomes, were also analyzed.

### 2.5 Diagnostic Process

The diagnosis of NsIP was confirmed through a multidisciplinary approach, integrating clinical evaluations, imaging studies, and histopathological assessments, where available. For COVID-19 AP, diagnosis was based on clinical presentation, imaging findings, and confirmed COVID-19 testing results.

Patients were divided into two primary groups for analysis. The **NsIP Group** consisted of individuals who met the diagnostic criteria for non-specific interstitial pneumonia. The **COVID-19 AP Group** included patients diagnosed with COVID-19-associated pneumonia. Additionally, a control group of healthy individuals was used to provide comparative data.

### 2.6 Statistical Analysis

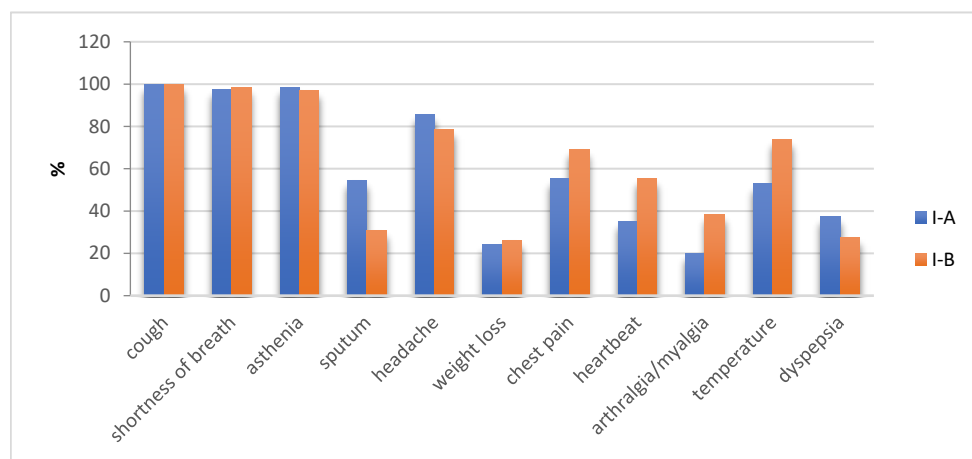
Data were analyzed to identify significant differences between the NsIP and COVID-19 AP groups in terms of epidemiological factors, clinical presentations, and treatment outcomes. Statistical tests included descriptive statistics, comparisons of means, and analysis of variance (ANOVA) where appropriate.

### 2.7 Ethics

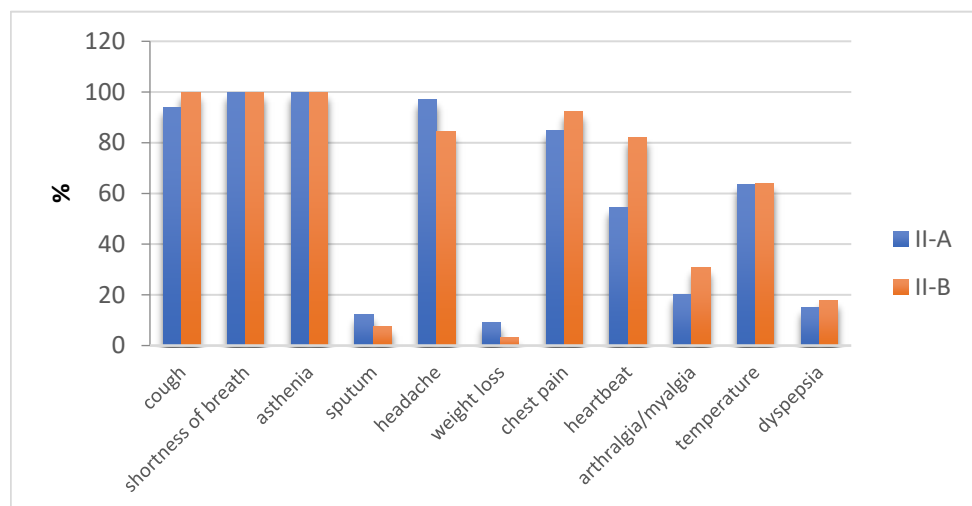
The study was conducted in accordance with the Declaration of Helsinki and was approved by the Institutional Review Board (IRB) of the Samarkand State Medical Association (SamSMA). As the study involved a retrospective review of medical records, patient consent was not required. However, all patient data were anonymized prior to analysis to ensure confidentiality and privacy. To ensure the protection of patient information, data were de-identified and accessible only to authorized personnel. All analyses were conducted in a secure environment to maintain confidentiality. No patient-identifiable information was disclosed or published, adhering to ethical guidelines for biomedical research. The study aimed to enhance the understanding of interstitial lung diseases, particularly NsIP and COVID-19 AP, and to improve diagnostic approaches and patient care. All research activities adhered to ethical guidelines for biomedical research involving human subjects.

**Table 1.** Gender and age characteristics of patients in groups and subgroups of examined patients

All examined patients n=262			
Total ,%	Men n=/cf.age		Women n=/cf.age
262(100%)/_cf. age	145(55,3%)	57.8±13.6	117(44,7%) 58.9±10.9
Patients with NsIP			
	I-A /cf. heavy current		I-B/ heavy current
Total n=109/27.5%	125(65,7)		65(34,3)
Men n=41/56.9%	63(60,6)		41(39,4)
average age	58.1±14.6		57.0±12.3
Women n=31/43,1%	62(72,1)		24(27,9)
average age	57.4±9.8		62.2±12.4
Patients with COVID-19 AP			
	II-A /cf. heavy current II-B/heavy current		II-A /cf. heavy current II-B/heavy current
Total n=72/27.5%	33(45,8)		39(54,2)
Men n=41/56.9%	18(43,9)		23(56,1)
average age	50.7±11.7		63.4±12.3
Women n=31/43,1%	15(48,4)		16(51,6)
average age	57.8±11.8		61.1±12.0



**Figure 1.** Clinical characteristics of symptoms in subgroups of patients with NsIP (I-A is moderate and I-B is severe)



**Figure 2.** Clinical characteristics of symptoms in subgroups of patients with COVID-19AP. (I-A is moderate and I-B is severe)

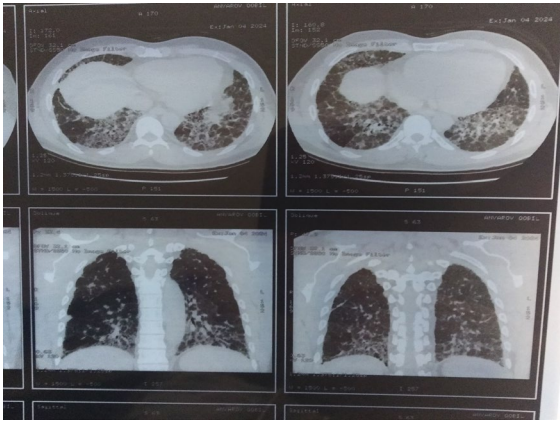


Figure 3. Patient Anvarov K.1958.diagnosis of ILF is the phenomenon of "cellular lung»

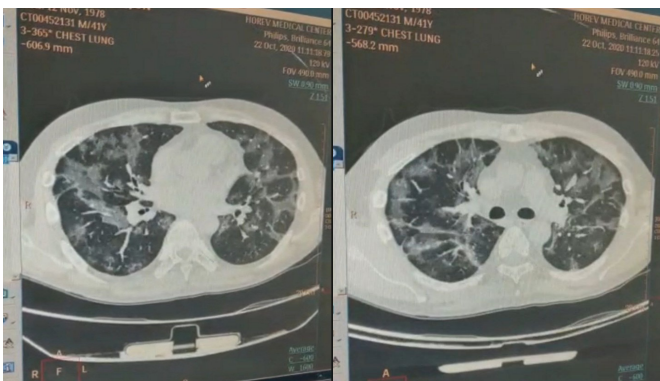


Figure 4. Patient Urinov A, born in 1978. Diagnosis of the phenomenon of "frosted glass»

### 3. Results and Discussion

In our study, we analyzed the medical records of 262 patients with interstitial lung disease (ILD) who were hospitalized at SamSMA between 2020 and 2023. The cohort comprised 190 patients with idiopathic non-specific interstitial pneumonia (NsIP), 72 patients with COVID-19-associated pneumonia (COVID-19 AP), and a control group of 20 healthy individuals. The diagnosis of idiopathic NsIP was made using a multidisciplinary approach that integrates clinical, radiological, and pathological data while excluding other potential causes (Avdeev et al., 2021; Verzhinina, 2013; Dvoretzky, 2014). Patients presenting with signs of idiopathic pulmonary fibrosis (IPF), other idiopathic interstitial pneumonias (IIPs), or significant consolidation were excluded from the study (Avdeev, 2014; Anaev, 2017).

Our patient population ranged from 18 to 90 years old. The distribution of age was as follows: 38 patients (15%) were aged 18-44 years, 87 patients (33%) were aged 45-59 years, 119 patients (45%) were aged 60-74 years, and 18 patients (7%) were aged 75-90 years. The overall cohort included 145 men (55.3%) with an average age of  $57.8 \pm 13.6$  years and 117 women (44.7%) with an average age of  $58.9 \pm 10.9$  years. Among the patients with NsIP, 54.7% were men and 45.3% were women. In the COVID-19 AP group, men constituted 56.0% and women 43.1%. The control group included 12 men (60%) and 8 women (40%).

We stratified the patients based on the severity of their condition. For NsIP, the severity was categorized into moderate (IA) with 125 patients (65.8%) and severe (IB) with 65 patients (34.2%). Similarly, for COVID-19 AP, the severity included moderate (IIA) with 33 patients (45.8%) and severe (IIB) with 39 patients (54.2%) (see Table 1). Our findings reveal that men predominated in the general cohort (55.3%) with a moderate course more common in NsIP (65.8%) and a severe course more common in COVID-19 AP (54.2%). The severity of the disease appeared to increase with age, with varying average ages across different subgroups.

Common symptoms observed in the study included dry unproductive cough, expiratory dyspnea, asthenia, headache, chest pain, palpitations, and low-grade fever. Weight loss, arthralgia, and dyspepsia were less frequent. The clinical manifestations of NsIP were generally similar to those of other chronic forms of IIP, including COVID-19 AP (Avdeev, 2014; Demura et al., 2015). The symptoms such as shortness of breath, dry cough, and asthenia were present in 93-100% of patients, while recurrent arthralgia was noted in 20-38.5% of cases, though it did not lead to joint deformity. Pain symptoms, including headache (78.5-96.9%) and chest pain (55.2-92.3%), were also prevalent (Figure 1, Figure 2).

The clinical picture of NsIP does not markedly differ from other chronic forms of IIP, particularly COVID-19 AP (Avdeev, 2014; Xu et al., 2014). The typical radiological findings for NsIP include bilateral reticular opacities, traction bronchiectasis, volume loss in

the lower lobes, and "ground-glass" opacities (Avdeev et al., 2021; Sebastiani et al., 2020). Unlike IPF, NsIP generally shows a better prognosis, with many studies reporting a five-year survival rate of over 70% (Anaev, 2017; Dvoretzky, 2009). The fibrotic phenotype was observed in more than 84% of cases, with bilateral symmetrical lesions in over 86%, and subpleural preservation being characteristic of NsIP (Avdeev et al., 2021; Xu et al., 2014) (Figure 3 Figure 4).

According to international research, nonspecific interstitial pneumonia (NsIP) is relatively common among the European population; however, data on its prevalence in the Samarkand region remain sparse. Our study reveals that among patients diagnosed with NsIP, men are more prevalent, comprising 55.3% (145 out of 262) of the cohort. The majority of patients are in the older age brackets, with 45% aged 45-59 years and 33% aged 60-74 years. Notably, 60% of the NsIP patients experienced a moderate course of the disease, contrasting with COVID-19 associated pneumonia (COVID-19AP), where severe cases are more common. Key indicators of a progressive and unfavorable prognosis in NsIP include a persistent dry, unproductive cough (reported in 93.6-100% of cases), expiratory dyspnea (97.6-100%), and significant asthenia (96.9-100%). Other important factors contributing to the severity include an increase in body mass index (BMI), reduced oxygen saturation, tachyarrhythmias, and tachypnea.

Advanced imaging techniques, such as high-resolution computed tomography (HRCT), alongside a multidisciplinary approach, are essential for accurate diagnosis and effective management. Despite ongoing discussions within respiratory medicine communities, there is still no universally accepted algorithm for the clinical diagnosis, prognosis, and treatment of NsIP. This highlights the need for continued research to establish standardized protocols and predictors for better management of this condition.

### 4. Conclusion

In conclusion, this study determined the significant role of nonspecific interstitial pneumonia (NsIP) as a prevalent idiopathic interstitial lung disease in the Samarkand region. Our findings indicate that NsIP predominantly affects older adults, with a higher incidence among men, and presents with a moderate disease course in 60% of patients, contrasting with the more severe course observed in COVID-19-associated pneumonia. Key clinical features of NsIP include persistent dry cough, expiratory dyspnea, and asthenia, which are associated with an increased body mass index, reduced oxygen saturation, and other complications. Advanced imaging, particularly high-resolution computed tomography (HRCT), and a multidisciplinary diagnostic approach are critical for accurate identification and management of NsIP. The study underscores the need for ongoing research to develop standardized diagnostic and treatment protocols, addressing the

current lack of a universal algorithm for NsIP, and improving patient outcomes through targeted interventions.

#### Author contributions

S.O.A. conceptualized the study and drafted the manuscript. S.G.Z. and E.M.M. contributed to data analysis and interpretation. K.J.J.O. assisted in writing sections of the manuscript and provided critical revisions. All authors reviewed and approved the final version of the manuscript.

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#### Competing financial interests

The authors have no conflict of interest.

#### References

- Anaev, E. H. (2017). Modern ideas about idiopathic pulmonary fibrosis: Biomarkers are in focus. *Pulmonology*, 27(1), 56-64.
- Avdeev, S. N. (2014). Idiopathic pulmonary fibrosis: A modern concept and approaches to diagnosis. *Practical Pulmonology*, 4, 16-23.
- Avdeev, S. N., Chikina, S. Yu., Tyurin, I. E., Belevsky, A. S., Terpigorev, S. A., Ananyeva, L. P., Wiesel, A. A., Boldina, M. V., Demko, I. V., Leshchenko, I. V., Trofimenko, I. N., Kinyakin, M. F., Stepanyan, I. E., Zaitseva, A. S., & Petrov, D. V. (2021). Chronic fibrotic interstitial lung diseases with progressive fibrotic phenotype: Resolution of the Interdisciplinary Council of Experts. *Pulmonology*, 31(4), 505–510. <https://doi.org/10.18093/0869-0189-2021-31-4-505-510>
- Bolotova, N. V., Cherednikova, K. A., Filina, N. Yu., Garifulina, L. M., & Logacheva, O. A. (2023). Modern view on the role of the intestinal microbiota in the development of metabolic disorders. *Pediatrics - Zhurnal im G.N. Speranskogo*, 102(4), 140–146.
- Bolotova, N. V., Filina, N. Yu., Kurdiyan, M. S., Garifulina, L. M., & Meshcheryakova, I. Y. (2022). Using transcranial magnetic therapy in combination with electrostimulation for correcting neuroendocrine-immune disorders in obese boys. *Russian Open Medical Journal*, 11(1).
- Boudlaie, H., Boghosian, A., Ahmad, I., Wekke, I. S., & Makhmudova, A. (2022). Investigating the mediating role of moral identity on the relationship between spiritual intelligence and Muslims' self-esteem. *HTS Teologiese Studies/Theological Studies*, 78(4), 7570.
- Calver, J. F., Fabbri, L., May, J., & Jenkins, R. G. (2023). COVID-19 in patients with chronic lung disease. *Clinics in Chest Medicine*, 44(2), 385-393. <https://doi.org/10.1016/j.ccm.2022.11.013>
- Demura, S. A., Kogan, E. A., & Paukov, V. S. (2015). Pathological repair in the niche areas of the stem cells of the respiratory lung in idiopathic pulmonary fibrosis. *Pulmonology*, 25(3), 350-356.
- Dvoretzky, L. I. (2009). The quality of life of an elderly patient. *Consilium Medicum*, 11, 98-102.
- Dvoretzky, L. I. (2014). Interstitial lung diseases in the elderly. *Pulmonology*, 4, 91-99.
- Ejam, S. S., Saleh, R. O., Catalan Opulencia, M. J., Karampoor, S., & Mirzaei, R. (2022). Pathogenic role of 25-hydroxycholesterol in cancer development and progression. *Future Oncology*, 18(39), 4415–4442.
- Giryes, S., Bragazzi, N. L., Bridgewood, C., De Marco, G., & McGonagle, D. (2022). COVID-19 vasculitis and vasculopathy-distinct immunopathology emerging from the close juxtaposition of type II pneumocytes and pulmonary endothelial cells. *Seminars in Immunopathology*, 44(3), 375-390. <https://doi.org/10.1007/s00281-022-00928-6>
- Makhmudova, A. (2020). Guarantee of legal basis of supporting human rights in new level of Uzbekistan's development. *International Journal of Advanced Science and Technology*, 29(5), 1761–1770.
- Makhmudova, A. (2020). Organizational and economic reasons preventing the development of ecological tourism in Uzbekistan. *Journal of Advanced Research in Dynamical and Control Systems*, 12(6), 1217–1220.
- Makhmudova, A. N. (2020). Factors and means of the content of legal socialization of the individual in modern civil society. *Journal of Advanced Research in Dynamical and Control Systems*, 12(7 Special Issue), 2038–2046.
- Ministry of Health of the Russian Federation. (2016). Idiopathic pulmonary fibrosis. *Clinical Recommendations*, 44C.
- Mirekina, E. V., Yarmukhamedova, N. A., Galimzyanov, Kh. M., & Cherenova, L. P. (2020). Differential diagnostics of the Crimean hemorrhagic fever and measles at the modern stage. *Infectious Diseases: News, Opinions, Training*, 9(1), 103–108.
- Mukhin, N. A. (Ed.). (2007). *Interstitial lung diseases*. Litterra.
- Odilov, A., Volkov, A., Abdullaev, A., Gasanova, T., & Lipina, T. (2021). COVID-19: Multiorgan dissemination of SARS-CoV-2 is driven by pulmonary factors. *Viruses*, 14(1), 39. <https://doi.org/10.3390/v14010039>
- Sebastiani, M., Faverio, P., Manfredi, A., Cassone, G., Vacchi, C., Stainer, A., Pozzi, M. R., Salvarani, C., Pesci, A., & Luppi, F. (2020). Interstitial pneumonia with autoimmune features: Why rheumatologist-pulmonologist collaboration is essential. *Biomedicines*, 9(1), 17. <https://doi.org/10.3390/biomedicines9010017>
- Shodikulova, G. Z., & Babamuradova, Z. B. (2020). Assessment of extracellular matrix condition in persons with undifferentiated connective tissue dysplasia. *International Journal of Pharmaceutical Research*, 2850. <https://doi.org/10.31838/ijpr/2020.SP1.265>
- Shodikulova, G. Z., & Babamuradova, Z. B. (2020). Occurrence of clinical options of undifferentiated connective tissue dysplasia in Uzbek population. *International Journal of Psychosocial Rehabilitation*, 24(2), 1347-1359.
- Sommer, N., & Schmeck, B. (2022). Pulmonale manifestationen bei long-COVID [Pulmonary manifestations in long COVID]. *Innere Medizin (Heidelberg)*, 63(8), 819-829. <https://doi.org/10.1007/s00108-022-01371-3>
- Teoh, A. K. Y., & Corte, T. J. (2020). Nonspecific interstitial pneumonia. *Seminars in Respiratory and Critical Care Medicine*, 41(2), 184-201. <https://doi.org/10.1055/s-0040-1708499>
- Tomassetti, S., Ryu, J. H., Piciucchi, S., Chilosi, M., & Poletti, V. (2016). Nonspecific interstitial pneumonia: What is the optimal approach to management? *Seminars in Respiratory and Critical Care Medicine*, 37(3), 378-394. <https://doi.org/10.1055/s-0036-1583176>
- Vershina, M. V. (2013). Idiopathic interstitial pneumonia. *Attending Physician*, 1, 3-9.

- Xu, W., Xiao, Y., Liu, H., Qin, M., Zheng, W., & Shi, J. (2014). Nonspecific interstitial pneumonia: Clinical associations and outcomes. *BMC Pulmonary Medicine*, 14, 175. <https://doi.org/10.1186/1471-2466-14-175>
- Zabozlaev, F. G., Kravchenko, E. V., Gallyamova, A. R., & Letunovsky, N. N. (2020). Pathological anatomy of the lungs in new coronavirus infection (COVID-19). Preliminary analysis of autopsy studies. *Clinical Practice*, 11(2). <https://doi.org/10.17816/clinpract34849>