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## ORIGINAL RESEARCH

# Assessment of osteoporosis in patients with interstitial lung disease

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**ABSTRACT**
**Background:**Interstitial lung disease (ILD) is a group of lung disorders characterized by inflammation and scarring (fibrosis) of the interstitium. The present study was conducted to assess osteoporosis in patients with interstitial lung disease.
**Materials & Methods:**96 patients with interstitial lung diseaseof both gendersunderwent a dual-energy x-ray absorptiometry scan. Duration of symptoms, previous anti-tubercular therapy (ATT), diabetes, smokers, SaO2, FVC and steroid use were also recorded. Two groups were made. Group I was osteoporosis and group II was no osteoporosis group.
**Results:** Out of 96 patients, males were 58 and females were 38. BMI in group I patients was 23.5kg/m2 and in group II patients was 23.1kg/m2. The mean duration of symptoms was 3.5years in group I and 1.2years in group II. Previous ATT was seen in 6 and 10, steroid use in 15 and 17, diabetes in 7 and 13, ever smokers were 6 and 7 in group I and II respectively. SaO2 was 93.2% and 94.6%, FVC was 72% and 69% respectively. The difference was significant (P< 0.05).
**Conclusion:** Authors found that half of the patients had osteoporosis. Osteoporosis seems to be a common extra-pulmonarymanifestation of ILD.
**Key words:**Interstitial lung disease, Osteoporosis, steroid

## Introduction

Interstitial lung disease (ILD) is a group of lung disorders characterized by inflammation and scarring (fibrosis) of the interstitium, which is the tissue that surrounds and supports the alveoli (air sacs) in the lungs.[1] The interstitium is composed of the walls of the air sacs, the tiny blood vessels, and the connective tissue between the air sacs.[2]There are numerous types of ILDs, and they can be caused by various factors, including idiopathic Interstitial Pneumonias (IIPs) such as idiopathic pulmonary fibrosis (IPF), cryptogenic organizing pneumonia (COP), and nonspecific interstitial pneumonia (NSIP). Some ILDs are associated with autoimmune disorders, such as rheumatoid arthritis, systemic sclerosis (scleroderma), and lupus.[3,4]

Several chronic respiratory disorders, including cystic fibrosis, pulmonary hypertension, and chronic obstructive pulmonary disease (COPD), have been linked to osteoporosis, a clinically significant comorbidity.[5] Among the factors that raise the risk of osteoporosis in COPD patients include advanced age, inactivity, poor diet, tobacco use, long-term corticosteroid

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usage, and systemic inflammation. Given the prevalence of these characteristics in patients with ILD, there may be a greater chance of osteoporosis development in this population.[6] Research conducted outside of India has revealed that between 13% and 44% of ILD patients had osteoporosis. Among the variables that may raise the risk of osteoporosis in ILD include old age, low body mass index (BMI), and Hispanic ethnicity.[7]The present study was conducted to assess osteoporosis in patients with interstitial lung disease.

**Materials & Methods**

The present study consisted of 96 patients with interstitial lung diseaseof both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. All patients underwent a dual-energy x-ray absorptiometry scan of the femoral neck to measure bone mineral density. Osteoporosis wasdiagnosed based on their T-scores, following the World Health Organization guidelines. Duration of symptoms, previous anti-tubercular therapy (ATT), diabetes, smokers, SaO2, FVC and steroid use were also recorded. Based on T-scores, two groups were made. Group I was osteoporosis and group II was no osteoporosis group. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

**Results**

**Table I Distribution of patients**

| Total- 96 | | |
|---|---|---|
| **Gender** | **Male** | **Female** |
| Number | 58 | 38 |

Table I show that out of 96 patients, males were 58 and females were 38.

**Table II Assessment of parameters**

| Parameters | Group I (42) | Group II (54) | P value |
|---|---|---|---|
| BMI (kg/m2) | 23.5 | 23.1 | 0.82 |
| Duration of symptoms(years) | 3.5 | 1.2 | 0.01 |
| Previous ATT | 6 | 10 | 0.05 |
| steroid use | 15 | 17 | 0.93 |
| Diabetes | 7 | 13 | 0.02 |
| Ever smokers | 6 | 7 | 0.92 |
| SaO2 (%) | 93.2 | 94.6 | 0.45 |
| FVC (%) | 72 | 69 | 0.17 |

Table II, graph I show that BMI in group I patients was 23.5kg/m2 and in group II patients was 23.1kg/m2. The mean duration of symptoms was 3.5years in group I and 1.2years in group II. Previous ATT was seen in 6 and 10, steroid use in 15 and 17, diabetes in 7 and 13, ever smokers were 6 and 7 in group I and II respectively. SaO2 was 93.2% and 94.6%, FVC was 72% and 69% respectively. The difference was significant (P< 0.05).

**Graph I Assessment of parameters**

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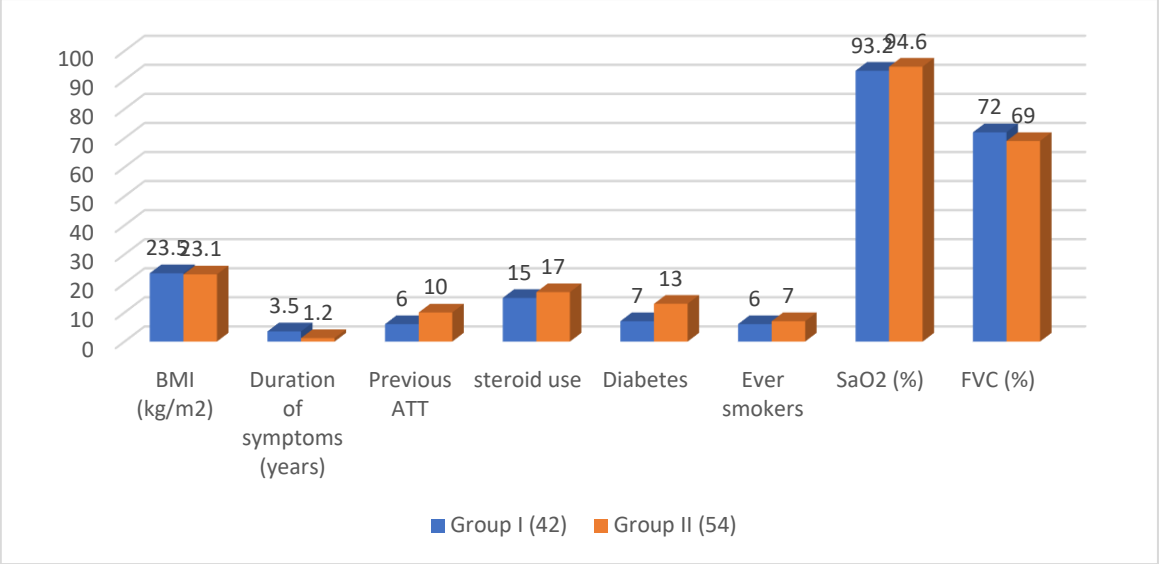


## Discussion

A class of more than 200 illnesses known as interstitial lung disease (ILDs) is defined by pulmonary fibrosis, which frequently results in a worsening cough and dyspnea.[8] In addition to respiratory complications, the illness is frequently linked to comorbid conditions like coronary artery disease, dyspnea, pulmonary hypertension, gastroesophageal reflux, depression, and reflux reflux, which exacerbate symptoms and lower the patients' quality of life overall.[9]The present study was conducted to assess osteoporosis in patients with interstitial lung disease.

We found that out of 96 patients, males were 58 and females were 38. Aggarwal et al[10] determined the prevalence and predictors of osteoporosis in ILD patients. They found that the mean age of the 97 ILD patients was 55.7 + 12.6 years (range 28–84 years) with the predominance of females (n = 61). Osteoporosis was detected in 39 (40.2%) patients. Female gender, duration of symptoms, and low hemoglobin level had a positive association with osteoporosis on univariate analysis ($P < 0.05$). However, duration of symptoms (adjusted odds ratio [OR]-1.29; 95% confidence interval CI-1.02–1.63; $P = 0.04$) and hemoglobin level (adjusted OR-0.59; 95% CI-0.39–0.89; $P = 0.01$) were the independent risk factors of osteoporosis on multivariate analysis.

We found that BMI in group I patients was 23.5kg/m2 and in group II patients was 23.1kg/m2. The mean duration of symptoms was 3.5years in group I and 1.2years in group II. Previous ATT was seen in 6 and 10, steroid use in 15 and 17, diabetes in 7 and 13, ever smokers were 6 and 7 in group I and II respectively. SaO2 was 93.2% and 94.6%, FVC was 72% and 69% respectively.Exposure to certain occupational and environmental factors, such as asbestos, silica, and certain types of mold, can lead to ILD.[11]Some medications can cause lung damage and lead to ILD. Examples include certain chemotherapy drugs, antibiotics, and anti-inflammatory drugs.Hypersensitivity Pneumonitis is an inflammatory lung disease caused by the inhalation of various environmental substances, such as mold, bird droppings, or certain chemicals.[12]Sarcoidosis is a systemic disease characterized by the formation of granulomas (inflammatory nodules) in various organs, including the lungs.Treatment options for ILD depend on the specific type and cause of the disease.[13] In some cases, medications such as corticosteroids or immunosuppressive drugs may be prescribed to reduce inflammation. Oxygen therapy and pulmonary rehabilitation may also be recommended to manage symptoms and improve quality of life.[14] In more severe cases, lung transplantation might be considered.It's important for individuals with symptoms suggestive of ILD to seek

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medical attention promptly, as early diagnosis and intervention can significantly impact the course of the disease.[15]

Osteoporosis is widely prevalent in apparently healthy adults both in India and outside. Conservative estimates suggest that around 20% of Indian women and about 10%–15% of men above 50 years of age have osteoporosis.Babhulkar S[16]analysis of BMD in 31,238 adults showed a prevalence of 18.3% osteoporosis in the healthy Indian population.

The limitation of the study is the small sample size.

## Conclusion

Authors found that half of the patients had osteoporosis. Osteoporosis seems to be a common extra-pulmonarymanifestation of ILD.

## References

1. Desai O, Winkler J, Minasyan M, Herzog EL. The role of immune and inflammatory cells in idiopathic pulmonary fibrosis. Front Med (Lausanne) 2018;5:43.
2. Vasakova M, Selman M, Morell F, Sterclova M, Molina-Molina M, Raghu G. Hypersensitivity pneumonitis: Current concepts of pathogenesis and potential targets for treatment. Am J Respir Crit Care Med 2019;200:301-8.
3. Parra ER, Kairalla RA, Ribeiro de Carvalho CR, Eher E, Capelozzi VL. Inflammatory cell phenotyping of the pulmonary interstitium in idiopathic interstitial pneumonia. Respiration 2007;74:159-69.
4. Erlebacher A, Derynck R. Increased expression of TGF-beta 2 in osteoblasts results in an osteoporosis-like phenotype. J Cell Biol 1996;132:195-210.
5. Akkawi I, Zmerly H. Osteoporosis: Current concepts. Joints 2018;6:122-7. 28. KhadilkarAV, MandlikRM. Epidemiology and treatment of osteoporosis in women: An Indian perspective. Int J Womens Health 2015;7:841-50.
6. Mitrache C, Passweg JR, Libura J, Petrikkos L, Seiler WO, Gratwohl A, et al. Anemia: An indicator for malnutrition in the elderly. Ann Hematol 2001;80:295-8.
7. Caplan-Shaw CE, Arcasoy SM, Shane E, Lederer DJ, Wilt JS, O'Shea MK, et al. Osteoporosis in diffuse parenchymal lung disease. Chest 2006;129:140-6.
8. Lane NE. Epidemiology, etiology, and diagnosis of osteoporosis. Am J Obstet Gynecol 2006;194:S3-11.
9. Tschopp O, Boehler A, Speich R, Weder W, Seifert B, Russi EW, et al. Osteoporosis before lung transplantation: Association with low body mass index, but not with underlying disease. Am J Transplant 2002;2:167-72.
10. Aggarwal D, Palta A, Jindal R, Kumar A, Sodhi MK, Saini V. Prevalence and predictors of osteoporosis in patients of interstitial lung disease: An observational study from North India. Indian J Respir Care 2022;11:353-7.
11. Okazaki R, Watanabe R, Inoue D. Osteoporosis associated with chronic obstructive pulmonary disease. J Bone Metab 2016;23:111-20.
12. Lu PC, Yang YH, Guo SE, Yang TM. Factors associated with osteoporosis in patients with chronic obstructive pulmonary disease – A nationwide retrospective study. Osteoporos Int 2017;28:359-67.
13. Pan ML, Chen LR, Tsao HM, Chen KH. Iron deficiency anemia as a risk factor for osteoporosis in Taiwan: A nationwide population-based study. Nutrients 2017;9:616.
14. AlhamadEH, NadamaR. Bone mineral density in patients with interstitial lung disease. Sarcoidosis Vasc Diffuse Lung Dis 2015;32:151-9.
15. Kumar R, Gupta N, Goel N. Spectrum of interstitial lung disease at a tertiary care centre in India. Pneumonol Alergol Pol 2014;82:218-26.

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16. Babhulkar S, Seth S. Prevalence of osteoporosis in India: An observation of 31238 adults. Int J Res Orthop 2021;7:362-8. 23.