
# Addis Ababa University

## College of Health Sciences

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**Clinical Profile and Outcome of Patients with Rheumatoid Arthritis Associated Interstitial Lung Disease in Addis Ababa: A Multicentric, Five Year Retrospective Study.**

A thesis submitted to Addis Ababa University, College of Health Sciences, School of Medicine, Department of Internal Medicine in partial fulfillment of the requirement for a specialty certificate in Internal Medicine. **April 2025**

# Declaration

I, Melese Mengistu, hereby declare that this manuscript is the product of my own original work, except where references to previous literature have been appropriately cited. To the best of my knowledge, this work has not been submitted for any prior academic award or qualification at this institution.

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## Approval of thesis submission

I hereby confirm that I have reviewed this thesis, prepared under my supervision, and I recommend its acceptance as meeting the requirements for the thesis.

| Name of Thesis Advisors | Signature | Date |
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| Name of Head of Department | Signature | Date |
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# Acknowledgment

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# Research summary information

| | |
|---|---|
| **Name Of Principal Investigator** | Dr. Melese Mengistu Mengesha |
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## List of Abbreviations

ACPA – Anti-Citrullinated Protein Antibodies

AOR – Adjusted Odds Ratio

CXR – Chest X-Ray

COPD – Chronic Obstructive Pulmonary Disease

COR – Crude Odds Ratio

CRP – C-Reactive Protein

DAS28-ESR – Disease Activity Score-28 with Erythrocyte Sedimentation Rate

DLCO – Diffusing Capacity for Carbon Monoxide

DMARDs – Disease-Modifying Antirheumatic Drugs

EHR – Electronic Health Records

ESR – Erythrocyte Sedimentation Rate

EULAR/ACR – European League Against Rheumatism/American College of Rheumatology

FEV1 – Forced Expiratory Volume in 1 Second

FVC – Forced Vital Capacity

GERD – Gastroesophageal Reflux Disease

HAQ-DI – Health Assessment Questionnaire-Disability Index

HIV – Human Immunodeficiency Virus

HRCT – High-Resolution Computed Tomography

ILD – Interstitial Lung Disease

LIP – Lymphocytic Interstitial Pneumonia

mMRC – Modified Medical Research Council Dyspnea Scale

NSIP – Nonspecific Interstitial Pneumonia

OP – Organizing Pneumonia

PFT – Pulmonary Function Test

QoL – Quality of Life

RA – Rheumatoid Arthritis

RA-ILD – Rheumatoid Arthritis-Associated Interstitial Lung Disease

RF – Rheumatoid Factor

TASH – Tikur Anbessa Specialized Hospital

UIP – Usual Interstitial Pneumonia

## Abstract

**Background:** Rheumatoid arthritis-associated interstitial lung disease (RA-ILD) is a severe complication of rheumatoid arthritis, leading to significant morbidity and mortality. However, there is limited data on its clinical characteristics, serology, imaging, health-related quality of life, and predictors of poor treatment outcomes in resource-limited settings, including Ethiopia.

**Objective:** This study aims to evaluate the clinical profile, imaging characteristics, laboratory findings, and factors associated with poor treatment outcomes among patients with RA-ILD in selected specialized hospitals in Addis Ababa.

**Methods:** This is a multicenter retrospective cohort study utilizing electronic medical records (EMRs) and phone call interviews from RA patients diagnosed with RA-ILD between February 2020 and February 2025. Data on demographics, clinical presentations, radiological findings (HRCT), PFT results, and serological markers were collected using a structured data collection tool. Descriptive statistics was used to calculate the frequency and percentage of both dependent and independent variables. Logistic regression was employed to explore the relationship between the outcome variable and the independent variables.

**Results**: A total of 62 patients were included in the study, with the majority being female (95.2%) and a mean age of 53.3 ± 12.6 years. The most common symptoms were cough (93.5%), fatigue (43.5%), and dyspnea (35.5%). Serological testing revealed high positivity for rheumatoid factor (83.9%) and anti-cyclic citrullinated peptide (anti-CCP) antibodies (88.7%). HRCT findings indicated that all patients had reticulation, and 90.3% had traction bronchiectasis. A usual Interstitial Pneumonia (UIP) pattern was present in 68% of cases. All patients were diagnosed with restrictive pulmonary disease. The overall poor treatment outcome rate was 61.3%, with a mortality rate of 11.3%. No significant associations between clinical, laboratory, or imaging variables and poor outcomes were identified, likely due to the study's small sample size. However, RF positivity, fatigability, higher subjective pain score, longer ILD treatment duration, and high DAS-28 ESR showed trends toward potential association with poor outcome, while methotrexate use showed a trend toward reduction in the odds of poor treatment outcomes.

**Conclusion**: This study is the first to evaluate RA-ILD in Ethiopia, revealing a high prevalence of respiratory symptoms, positive serological markers, and characteristic HRCT patterns. Despite this, the high rate of poor treatment outcomes and mortality emphasizes the need for early detection and management. Larger studies are needed to further investigate these findings and refine treatment strategies for RA-ILD in Ethiopia.

**Keywords**: RA; RA-ILD; Risk factors; Ethiopia

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# 1. Introduction

## 1.1. Background

Rheumatoid arthritis (RA) is a chronic, systemic inflammatory disease affecting approximately 0.5–1% of the global adult population, with women disproportionately affected(1, 2). The prevalence and characteristics of RA in Sub-Saharan Africa are less well-documented. However, existing studies indicate substantial variability(3, 4). For instance, the prevalence of RA among patients on rheumatology clinic follow-up ranges from 2.2% in Burkina Faso to 33% in Kenya, while a hospital-based study in Ethiopia reported that RA constituted approximately 18.5% of rheumatologic outpatient cases at Tikur Anbessa Specialized Hospital in Addis Ababa(5, 6). These regional variations shows the significance of studying RA within African settings, where unique factors may shape disease manifestation(3, 4).

RA is primarily characterized by progressive joint destruction, yet its impact extends beyond the joints, manifesting in serious extra-articular complications such as rheumatoid arthritis-related interstitial lung disease (RA-ILD) (7, 8). RA-ILD significantly contributes to the morbidity and mortality associated with RA, with some studies estimating that RA-ILD affects roughly 10% of patients with clinically confirmed RA (7, 8). However, subclinical cases may be under-recognized, as studies utilizing high-resolution computed tomography (HRCT) reveal ILD changes in up to 58% of RA patients, suggesting the true burden may be substantially higher(7, 9).

RA-ILD typically presents with distinct radiological patterns, most commonly the usual interstitial pneumonia (UIP) subtype, which is associated with poorer prognosis compared to other subtypes, such as nonspecific interstitial pneumonia (NSIP)(7, 8). Established risk factors for RA-ILD include advanced age, male gender, smoking history, and high RA disease activity(10, 11). Genetic factors also play a role, as recent studies highlight a potential genetic predisposition in those with the MUC5B promoter variant, commonly found in European populations(10, 11). This variant's low frequency among African and Asian populations suggests significant ethnic and genetic variability in RA-ILD susceptibility (7, 9, 11). For instance, among studies looks at the factors associated with RA-ILD, recent studies from Zanzibar and Nigeria report RA-ILD in predominantly non-smoking patients, a pattern contrasting with findings from Western countries

where smoking is a major risk factor(3, 12). This distinction suggests that other factors potentially genetic or environmental may be at play in African population(3, 11).

Management of RA and its pulmonary complications in low-resource settings, such as those in sub-Saharan Africa presents unique challenges(4). Diagnostic and treatment limitations complicate early detection and comprehensive care for RA-ILD(3, 4). Access to HRCT imaging and pulmonary function tests (PFTs) is limited, and disease-modifying antirheumatic drugs (DMARDs) and biologics, though standard in high-income countries, are often inaccessible or prohibitively expensive in African countries(4). In Ethiopia, for instance, methotrexate and prednisolone remain the most commonly prescribed medications, often used over extended periods despite international guidelines suggesting minimal duration for corticosteroids(5). Studies from African indicate that prolonged prednisolone use, often beyond six months, is commonly used which diverge from standard practices in RA management in wealthier regions (3, 13).

To our best knowledge, there are only a few researches done in Africa but there is no research done in Ethiopia regarding RA-ILD. To address this knowledge gaps within the context of Ethiopia this study aims to examine the clinical presentations, radiological findings, serological profiles, pulmonary function and, factors associated among patients with RA-ILD in Addis Ababa, Ethiopia. We seek to develop a more nuanced understanding of RA-ILD in this population to create insight for informing clinical practice and guiding healthcare policies tailored to the specific needs and constraints of resource-limited setting.

## 1.2. Statement of the problem

Rheumatoid arthritis is a chronic, systemic inflammatory disease affecting approximately 0.5–1% of the global adult population, with women disproportionately affected(1, 2), with significant extra-articular manifestations. Although RA-related extra-articular complications are prevalent and significantly complicate RA management, the lack of evidence on their prevalence and proper characterization, particularly in resource-limited settings like Ethiopia, further exacerbates the challenges in providing tailored management(4). RA-ILD contributes to a substantial proportion of RA-associated morbidity and mortality, with studies suggesting its prevalence ranges from 10% to 58% depending on the diagnostic methods employed(14). However, these figures are primarily derived from studies conducted in high-income countries. This leaves a significant knowledge

gaps in resource-limited settings like Ethiopia. Beyond its largely unexplored prevalence, RA-ILD has a substantial impact on morbidity and mortality among RA patients, linked to our limited understanding of its clinical, radiological, serological, and histopathological characteristics in Ethiopia. Moreover, evidence suggest variability in factors contributing to RA-ILD between Western countries and African populations, with available studies suggesting unique genetic and environmental influences in African populations(3, 4, 12). In Ethiopia, there is a critical lack of evidence on factors associated with RA-ILD, which limits efforts to guide early prevention and interventions aimed at reducing the morbidity and mortality associated with it. To our best knowledge, there are only a few researches done in Africa but there is no research done in Ethiopia. Therefore, we aim to address these gaps by characterizing RA-ILD and its associated factors in Addis Ababa, Ethiopia.

### 1.3. Significance of the study

This study looks forward to bridge the significant gap in knowledge regarding RA-ILD in Ethiopia, where such complication of RA remain under-researched and underdiagnosed due to resource limitation of diagnostic modalities. By characterizing the clinical, radiological, serological, and pulmonary function profiles of RA-ILD patients, we aim to provide critical insights into the burden and presentation of RA-ILD in the Ethiopian population. Furthermore, due to RA-ILD profound impact of mortality and morbidity among RA patients, we aim to identify contributing factors to reduce adverse clinical outcomes associated with it through more effective prevention, early detection, and management strategies. The findings from this study will enhance understanding of RA-ILD in Ethiopia beside this it also contribute to the broader body of knowledge on this disease in sub-Saharan Africa

# 2. Literature review

## 2.1. Introduction

RA is one of the most common autoimmune diseases affecting approximately 0.5–1% of the global adult population, with women disproportionately affected, and can severely reduce the quality of life(1, 2). RA is primarily characterized by progressive joint destruction, yet its impact extends beyond the joints, manifesting in serious extra-articular complications, including the most prevalent lung complication, RA-ILD (7, 8). RA-ILD is a progressive fibrotic lung disease and correlated with increased morbidity, mortality, and healthcare utilization(7, 14). There is an evidence gap regarding the prevalence, and proper characterization of RA-ILD, particularly in resource-limited settings like Ethiopia. Furthermore, the lack of locally known risk factors contributing to RA-ILD in RA patients challenges the risk stratification for early identification and prevention. Therefore, we aim to use real-world data from Tikur Anbessa Hospital, Lancet Specialized Internal Medicine and Surgical Center, and Rheum Rheumatology and Internal Medicine Specialty Clinic in Addis Ababa, Ethiopia to address these gaps by characterizing RA-ILD and its associated factors in Addis A baba, Ethiopia.

## 2.2. Overview of RA

RA is a systemic autoimmune disease characterized by chronic inflammation of synovial joints, leading to progressive joint destruction, deformity, and disability (15, 16). Although its primary manifestations are musculoskeletal, RA is increasingly recognized as a systemic disease with significant extra-articular involvement, affecting multiple organ systems such as the lungs, heart, eyes, and nervous system (10, 15, 17). The global prevalence of RA is approximately 0.5–1%, with women being disproportionately affected compared to men (1). In sub-Saharan Africa, the prevalence varies widely, ranging from 0.1% in rural areas to 2.5% in urban settings, reflecting differences in healthcare access and diagnostic resources (3, 4).

RA progresses through a complex interplay of genetic, environmental, and immunological factors (11, 15, 16). Genetic studies have identified associations with HLA-DRB1 and DRB2 alleles, particularly the shared epitope, which increases susceptibility and severity of the disease. Environmental factors, including smoking and microbial dysbiosis, have also been implicated in the pathogenesis (11, 16, 18). Autoantibodies such as rheumatoid factor (RF) and anti-citrullinated protein antibodies (ACPAs) are key biomarkers of disease and are associated with both articular and extra-articular manifestations(11, 16).

Extra-articular manifestations are a significant component of RA and include cutaneous, pulmonary, cardiac, and neurological complications (8, 17). Interstitial lung disease (ILD), for instance, occurs in 5–10% of RA patients and is often associated with poor prognosis (1, 14). Rheumatoid nodules, Raynaud's phenomenon, and vasculitis are other common extra-articular manifestations that significantly impact morbidity and mortality (17). Studies highlight that patients with severe extra-articular manifestations have greater comorbidities and an increased risk of premature death compared to those without extra-articular manifestations (17). Moreover, genetic predispositions, such as homozygosity for HLA-DRB1 and certain polymorphisms, increase the likelihood of developing severe extra-articular manifestations (18).

In Ethiopia, RA accounts for 18.5% of rheumatologic cases in specialized outpatient clinics, with most patients presenting at advanced stages (5). Limited access to advanced diagnostic tools, such as HRCT and PFTs, exacerbates diagnostic delays (5). Additionally, treatment largely relies on corticosteroids and methotrexate due to the high cost and limited availability of biologic therapies (5). This divergence from global standards suggests the unique challenges faced in resource-limited settings (2, 4, 5). Despite advancements in understanding RA, significant gaps remain in the characterization of its prevalence, clinical features, and management in Ethiopia.

### 2.3. Rheumatoid Arthritis Associated Interstitial Lung Disease

RA-ILD is a common extra-articular manifestation of RA, contributing significantly to mortality, morbidity, and reduced quality of life (14). Studies indicate that clinically evident RA-ILD affects 5–10% of RA patients (1, 14), while subclinical interstitial abnormalities may be present in up to 55% of cases when screened with HRCT (19–21). The lifetime risk of developing ILD is significantly elevated in RA patients compared to the general population, suggesting the importance of early detection and management (19).

RA-ILD is classified similarly to the other ILD from the American Thoracic Society's (ATS) classification based on pathologic and radiological findings into six major groups (22): -

1. Nonspecific interstitial pneumonia (NSIP)

2. Usual interstitial pneumonia (UIP),

3. Organizing pneumonia (OP)

4. Desquamative interstitial pneumonia (DIP)

5. Respiratory bronchiolitis-interstitial lung disease (RB-ILD)

6. Acute interstitial pneumonia (AIP)

There are rare causes like lymphoid interstitial pneumonia (LIP) and pluero-parenchymal fibroelastosis (23).

The course of RA-ILD varies significantly among patients. While the majority experience stable or slowly progressive disease, a subset develops rapidly advancing pulmonary fibrosis, especially in cases with the UIP sub-type, which is associated with increased mortality (23–25). Additionally, subclinical RA-ILD, often asymptomatic at initial detection, can progress to symptomatic stages over time, emphasizing the need for proactive monitoring and early intervention in high-risk individuals (23-25).

### 2.4. RA-ILD Characteristics

Table 1 summarizes the key characteristics of RA-ILD, including clinical presentation, pulmonary function test findings, radiological features, and serological markers. This structured representation shows critical details to facilitate understanding and diagnosis of RA-ILD, particularly in resource-constrained settings.

Table 1. Characteristics of RA-ILD

| **Category** | **Details** |
|---|---|
| C**linical Presentation(15, 16)** | **Dyspnea**: Initially on exertion, progresses to rest in advanced stages. |
| | **Dry Cough**: Common symptom, occasionally productive in cases of infection. |
| | **Fatigue**: Nonspecific but prevalent, reflecting systemic inflammation. |
| | **Crackles**: Fine, Velcro-like inspiratory crackles, particularly at the lung bases. |
| | **Asymptomatic Cases**: Frequently detected incidentally on imaging. |
| **PFT(17, 18)** | **Restrictive Defect:** Reduced FVC and TLC |
| | **Decreased DLCO**: Impaired gas exchange; often the earliest abnormality detected. |
| | **Serial Decline**: Progressive reduction in FVC and DLCO correlates with worsening fibrosis. |
| **Radiological Features(15, 17, 19, 20)** | **UIP**: Honeycombing, sub-pleural fibrosis, and traction bronchiectasis; poor prognosis(8). |
| | **NSIP**: Ground-glass opacities; better prognosis. |

| | |
|---|---|
| | **Other Patterns**: OP, LIP; uncommon. |
| | **HRCT**: Gold standard for RA-ILD diagnosis, particularly in early or subclinical cases. |
| **Serological Features(9)** | **RF**: Strong correlation with disease severity and progression. |
| | **ACPA**: High titers significantly increase RA-ILD risk. |
| | **Systemic Markers**: Elevated CRP and ESR indicate active inflammation. |

PFT: Pulmonary Function Tests; FVC: Forced Vital Capacity; TLC: Total Lung Capacity; DLCO: Diffusing Capacity for Carbon Monoxide; UIP: Usual Interstitial Pneumonia; NSIP: Nonspecific Interstitial Pneumonia; OP: Organizing Pneumonia; LIP: Lymphocytic Interstitial Pneumonia; HRCT: High-Resolution Computed Tomography; RF: Rheumatoid Factor; ACPA: Anti-Citrullinated Protein Antibodies; ESR: Erythrocyte Sedimentation Rate; CRP: C - reactive protein.

### 2.5. Risk factors of RA-ILD

Several factors are associated with an increased risk of developing RA-ILD. These include male gender, advanced age (particularly over 55 years), severe extra-articular manifestations, and high RA disease activity, indicated by higher DAS28-ESR, and higher HAQ values (20, 21,26,27,43). Smoking, whether current or in the past, significantly contributes to the risk (20, 21), as does sero-positivity for rheumatoid factor (RF) or anti-citrullinated protein antibodies (ACPAs) (9). Additionally, a family history of RA-ILD has been identified as a potential risk factor (21). Recognizing these risk factors is critical for the early detection and monitoring of high-risk patients.

### 2.6. RA-ILD Outcome

In patients with RA, presence of RA-ILD is related with increased morbidity and mortality rates (33). Among patients with RA-ILD, factors that affect outcome are female gender, old age, UIP pattern, low baseline forced vital capacity, decreased baseline diffusing capacity for carbon monoxide, frequent acute exacerbation of ILD, and uncontrolled disease activity (moderate/high DAS28-ESR) (34-42,43).

### 2.7. Conclusion

RA-ILD is significantly underdiagnosed and undertreated in Ethiopia, largely due to the limited availability of advanced diagnostic tools such as HRCT and PFT in the majority of

healthcare facilities in the country. These diagnostic gaps delay early detection, which is critical given the progressive nature of RA-ILD and its substantial contribution to morbidity and mortality among patients with RA (7, 14, 17).

A study from Zanzibar conducted in 2023 reported a prevalence of RA-ILD at approximately 3% based on HRCT findings, which were predominantly NSIP and UIP patterns (12). Interestingly, none of the RA-ILD patients in the Zanzibari cohort had a history of smoking, contrasting with findings from Western populations where smoking is a major risk factor. This suggests that genetic or environmental factors may play a larger role in RA-ILD pathogenesis in sub-Saharan African populations (12). Similarly, genetic predispositions like the MUC5B promoter variant, strongly linked to RA-ILD in European populations, have been reported to be rare in individuals of African ancestry (30–32). Although this goal is quite challenging in our current research faculties, these findings stress the need for localized studies to uncover genetic and environmental factors specific to the Ethiopian context.

In Ethiopia, the lack of comprehensive data on RA-ILD prevalence, clinical presentations, and associated risk factors further compounds the challenge of managing this RA-ILD. The limited availability of medications such as biologics and anti-fibrotic agents adds to the difficulty, leaving many patients reliant on corticosteroids and traditional DMARDs (5), which may not adequately address the fibrotic components of RA-ILD. Lessons from Zanzibar, where rituximab therapy showed promising results in halting disease progression, suggest that targeted therapies can make a meaningful difference, provided access is improved (12).

This study seeks to bridge these gaps by characterizing the clinical, radiological, and serological profiles of RA-ILD among Ethiopian patients. Moreover, we aim to inform early detection strategies, identify population-specific risk factors, and develop tailored management approaches suited to the constraints of resource-limited settings. The findings will not only enhance understanding of RA-ILD in Ethiopia but also contribute to the broader body of knowledge on this disease in sub-Saharan Africa.

## 2.8. Conceptual framework of the study

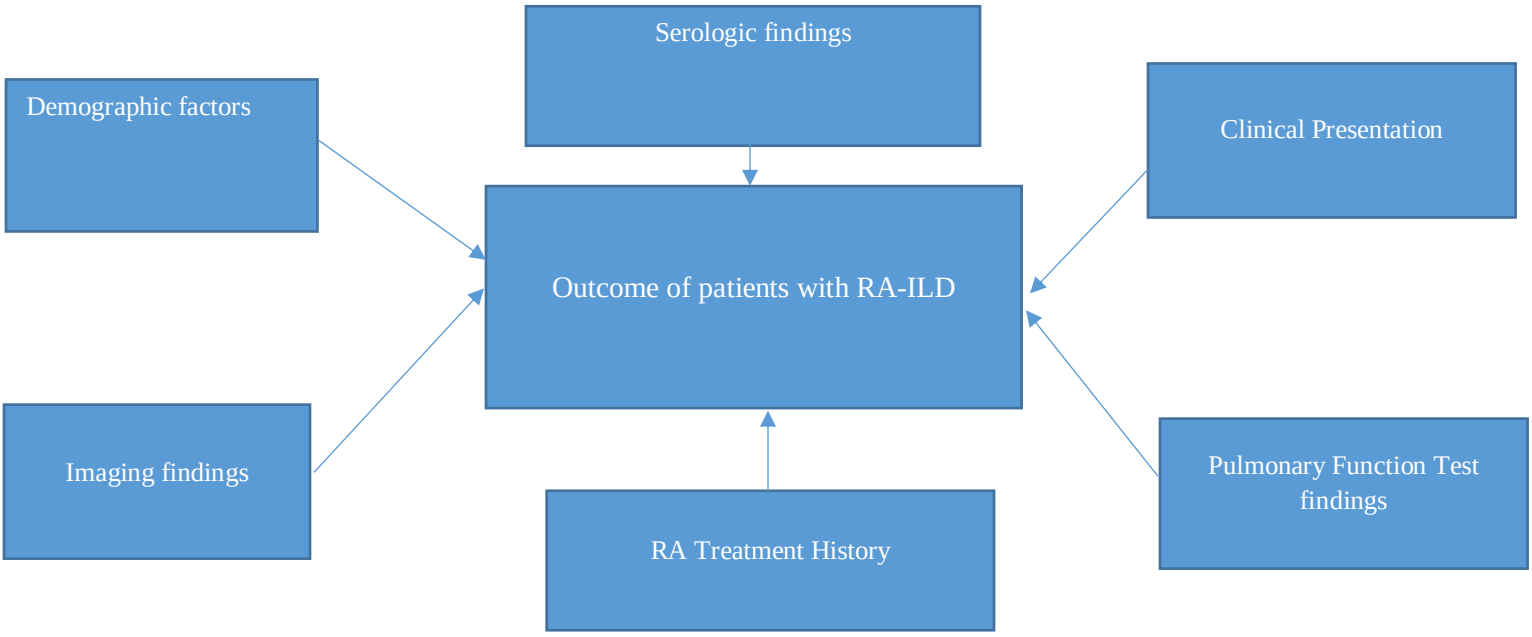



Figure 1: Conceptual Framework of the study

# 3. Objective

## 3.1. General Objective

To evaluate the clinical profile, imaging characteristics, laboratory findings, and factors associated with poor treatment outcomes among patients with rheumatoid arthritis-associated interstitial lung disease (RA-ILD) in selected specialized hospitals in Addis Ababa, Ethiopia, from February 2020 to February 2025.

## 3.2. Specific Objectives

- To describe the common clinical manifestations observed in patients with RA-ILD.
- To identify the common serological markers, present in RA-ILD patients.
- To analyze the chest imaging patterns findings in RA-ILD patients .
- To evaluate the predominant pulmonary function test (PFT) patterns in patients with RA-ILD.
- To identify factors associated with poor treatment outcomes among RA-ILD patients

# 4. Methodology

## 4.1. Study Design

A multicenter retrospective cohort study was conducted at TASH, Lancet Specialized Hospital, and Rheum Specialized Clinic in Addis Ababa from February 2020 to February 2025.

## 4.2. Study Setting and period

The study was conducted at TASH, Lancet Specialized Hospital, and Rheum Specialized Clinic in Addis Ababa, Ethiopia. TASH, is the biggest hospital in the country, located in Addis Ababa which is an Addis Ababa university affiliated teaching hospital. The hospital provides extensive rheumatology services and is the largest government hospital in the country, offering comprehensive healthcare to approximately half a million patients annually through specialty clinics and inpatient departments. Lancet Specialized Medical and Surgical Center is the biggest privately owned hospital in Addis Ababa. The center was established in 2020 and currently provides over 85,000 outpatient services annually, including rheumatology services provided by one of the only three rheumatologists in the country. Rheum Rheumatology and Internal Medicine Specialty Clinic was established in 2023. The clinic is led by a well-known rheumatologist and primarily offers rheumatology and internal medicine services.

This study was conducted from November 2024 to March 2025. This period was utilized to finalize the research proposal, collect data, analyze results, and produce the final research report

## 4.3. Study Population

The study population included patients who received care at the rheumatology units of TASH, Lancet Specialized Hospital, and Rheum Specialized Clinic in Addis Ababa, Ethiopia, between February 2020 and February 2025. This source population comprises all patients diagnosed with RA-ILD according to the latest clinical guideline (EULAR/ACR criteria (2)) for RA and radiologist-reported ILD within these facilities during the specified period. From this source, eligible patients were selected based on pre-specified criteria. The primary source for data collection was electronic health records and phone call interviews.

### 4.4. Inclusion and exclusion criteria

#### 4.4.1. Inclusion criteria

All patients with a diagnosis of rheumatoid arthritis-associated interstitial lung disease who attended the aforementioned hospitals from February 2020 to February 2025, with all of the following were included in the study.

- Patients aged 18 years and older.
- Patients who had follow-up care at specified facilities
- Patients with a confirmed diagnosis of RA according to recent EULAR/ACR criteria
- RA patients with HRCT findings suggestive of RA-ILD

#### 4.1.1. Exclusion criteria

Patients with any of the following were excluded:

- Patients under the age of 18
- Patients with other Pleuropulmonary manifestations of RA
- Patients with lung cancer
- Patients with other respiratory conditions likely to interfere with RA-ILD assessment
- Incomplete or Inadequate Health Records and Imaging modality

### 4.5. Sample size and sampling technique

A consecutive sampling method was employed to enroll all eligible participants. Specifically, all patients with a confirmed diagnosis of RA-ILD who were under follow-up at TASH, Lancet Specialized Hospital, and Rheum Specialized Clinic between February 2020 and February 2025 and met the predefined inclusion and exclusion criteria were included in the study.

### 4.6. Study variable

#### 4.6.1. Dependent Variables

Outcome of patients with Rheumatoid Arthritis Associated Interstitial Lung Disease (RA-ILD)

#### 4.1.1. Independent variables

- Socio-demographic Factors
- Clinical presentation
- Laboratory findings
- Imaging Findings
- Pulmonary function test findings

- RA Treatment History

### 4.7. Data collection and Quality assurance

Patient information were collected through phone call interviews and a thorough review of medical records. Data extraction was guided by a structured table to capture essential study details. Patient records from February 2020 to February 2025 was reviewed to gather demographic, clinical, and treatment information. Following data collection, all sources were verified and compiled to ensure accuracy and completeness. Data was collected using a structured questionnaire adapted from previously published studies, modified as necessary to ensure relevance, validity, and reliability for this study and converted to the Kobocollect after designed on kobotoolbox. The questionnaire included sections on socio-demographic details, medication history, clinical presentation, serological findings, PFT patterns, imaging results (CXR and HRCT), and outcome measures. Trained data collectors, selected from the nursing staff in the rheumatology unit, conducted data collection under the principal investigator's supervision. Data collectors undergone a two-day training session on accurately extracting information from patient records (iCare system and patient charts) and completing the structured checklist. Additionally, personnel for chart retrieval and management was recruited from the hospital records staff to assist in efficient data access. Data collectors were also participated in a one-day training focused on chart review and completion of the structured questionnaire.

### 4.8. Data quality control

The investigator examined the appropriateness of the methodologies. The questionnaire was reviewed for completeness, and pre-testing was conducted. Data collectors were trained, and data was collected by these trained nurses under the supervision of the investigator. The questionnaire was tested on 5% of the sample (10 charts) in a similar setting, which was not part of the study. Completed questionnaires were checked weekly for completeness and consistency by both the data collectors and the investigator during the data collection period. The data template included internal consistency checks, and any inconsistencies or ambiguities were promptly addressed.

### 4.9. Data analysis techniques

The data was checked, cleaned, and exported to SPSS version 27 for analysis. Descriptive statistics used to calculate the frequency and percentage of both dependent and independent variables, and frequency distributions was applied to organize and present the responses obtained. Measures of

central tendency and dispersion was calculated as appropriate for the study variables. Univariate logistic regression employed to explore the relationship between the outcome variable and the independent variables. All variables with a p-value < 0.25 in the univariate analysis considered candidates for the multivariable logistic regression model, with a p-value < 0.05 in the multivariable analysis indicating statistical significance.

## 4.10. Operational Definitions

**Clinical Manifestation**: Any new respiratory symptom or sign, such as dyspnea, cough, rapid breathing, sputum production, chest pain, rales, or hemoptysis, that has developed before, at the time of, or after the diagnosis of rheumatoid arthritis (RA).

**RA-ILD:** Radiologist described pattern that is highly consistent with ILD (e.g., usual interstitial pneumonia [UIP], nonspecific interstitial pneumonia [NSIP]) in the context of an established RA or diagnosed after the onset of ILD.

**Pulmonary Function Test Suggestive of ILD**: Pulmonary function test results indicating ILD, including reduced total lung capacity (TLC), vital capacity (VC), and forced expiratory volume (FEV), with a normal or increased FEV1/FVC ratio.

**Diagnosis of RA:** Diagnosis of rheumatoid arthritis based on the 2010 EULAR/ACR classification criteria (2).

**Severe extra-articular manifestations:** Presence of either of vasculitis, Felty's syndrome , neuropathy, serositis, occular involvement, or glomerulonephritis (26).

**Dyspnea score**: According to the modified medical research council score of 0 is no breathlessness, 1 is breathless when hurrying or walking up a hill, 2 is breathless when walking slower than people of same age or has to stop when walking, 3 is breathlessness stops walking after 100 m or a few minutes, and 4 is breathless when dressing or not able to leave the house (42).

**RA Disease Activity:** Disease Activity Score-28 for Rheumatoid Arthritis with ESR (DAS28-ESR) interpreted as remission if score is <2.6, low disease activity if score is ≥2.6 to <3.2, moderate if score is ≥3.2 to ≤5.1 and high if score is >5.1.

**Health-Related Quality of Life:** Measured by Health Assessment Questionnaire-Disability Index (HAQ-DI). It is a quantitative tool used to assess health related quality of life assessments related to rheumatoid arthritis and various other conditions. Scores 0-1 indicates mild to moderate disability, 1-2 indicates moderate to severe disability, and 2-3 indicates severe to very severe disability.

**Poor Outcome:** Modified medical research council dyspnea score of ≥2, and/or having any one of the following 1) admission to the hospital due to ILD, 2) ILD exacerbation, 3) hemoptysis , 4) HAQ-DI ≥2, or 5)death.

### 4.11 Ethical clearance

Ethical approval was obtained from the Institutional Review Board (IRB) of Addis Ababa University, College of Health Sciences, Department of Internal Medicine. Permission letters were submitted to respective data collection sites. Verbal consent was regained from study participants as the study used phone call interviews and secondary data. Data was fully anonymized and no personal identifiers, such as name and private information were collected. Confidentiality during all phases of research activities was maintained and data was held on a password-protected system.

### 4.12 Dissemination of result

The results of this study will be presented to the department of internal medicine as part of the internal medicine specialty thesis. Attempts will be made to present the results at scientific conferences and to publish the manuscript in local or international journals.

# 5. Results

## 5.1 Sociodemographic characteristics

Among the 62 patients who met the inclusion criteria, the majority were female (95.2%). The mean age of the participants was 53.3 ± 12.6 years, with more than one-third being above 60 years of age. The majority of the participants were government employees (85.5%) and currently married (62.9%) (Table 1).

Table 2: Sociodemographic Characteristics of RA Patients with ILD in Selected Hospitals in Addis Ababa, Ethiopia, 2025

| Variables | | Count | Percentage |
|---|---|---|---|
| **Sex** | Male | 3 | 4.8 |
| | Female | 59 | 95.2 |
| **Age** | 30-40 | 15 | 24.2 |
| | 41-50 | 8 | 12.9 |
| | 51-60 | 18 | 29.0 |
| | ≥61 | 21 | 33.9 |
| **Marital status** | Single | 4 | 6.5 |
| | Currently married | 53 | 85.5 |
| | Ever married | 5 | 8.1 |
| **Occupations** | Governmental employed | 39 | 62.9 |
| | Unemployed | 23 | 37.1 |

## 5.2 Presenting symptoms of RA with ILD

The majority of patients were diagnosed with RA between the ages of 41 and 50 years (37.1%), and ILD was most commonly diagnosed after the age of 50 (48.4%). A significant proportion of patients (53.2%) developed ILD within five years of RA diagnosis. The most common symptom was cough (93.5%), followed by fatigue (43.5%) and dyspnea (35.5%). Bibasilar rales were the most prevalent physical finding (9.7%). Additionally, one patient had decreased breath sounds, one had felty syndrome, and six patients exhibited neuropathy (table 2).

Among the study participants, steroids (96.8%) were the most frequently used medication, followed by methotrexate (85.5%). Mycophenolate mofetil and cyclophosphamide were used in approximately 10% of the patients, while leflunomide was used in 3.2%.

Table 3: Clinical Characteristics of RA Patients with ILD in Selected Hospitals in Addis Ababa, Ethiopia, 2025

| Variables | | Count | Percentage |
|---|---|---|---|
| **Age when RA diagnosed** | 20-30 | 6 | 9.7 |
| | 31-40 | 18 | 29.0 |
| | 41-50 | 23 | 37.1 |
| | >50 | 15 | 24.2 |
| **Age when RA-ILD Diagnosed** | 20-30 | 6 | 9.7 |
| | 31-40 | 11 | 17.7 |
| | 41-50 | 15 | 24.2 |
| | >50 | 30 | 48.4 |
| **Diagnosis of ILD after RA** | Within year | 14 | 22.6 |
| | Within five-year | 33 | 53.2 |
| | After five year | 15 | 24.2 |
| **Symptoms** | Cough | 58 | 93.5 |
| | Fatigue | 27 | 43.5 |
| | Dyspnea | 22 | 35.5 |
| | Exercise intolerance | 10 | 16.1 |
| | Tightens chest | 3 | 4.8 |
| | Hemoptysis | 3 | 4.8 |
| **Physical findings** | Bibasilar rales | 56 | 90.3 |
| | Wheeze | 3 | 4.8 |
| | Accentuated P2 | 3 | 4.8 |
| **Smoking History** | Active | 1 | 1.6 |
| | Past | 2 | 3.2 |
| | Never | 59 | 95.2 |
| **Severe extra-articular manifestations** | Felty syndrome | 1 | 1.6 |
| | Neuropathy | 6 | 9.7 |
| | None | 55 | 88.7 |
| **History of medication** | Methotrexate | 53 | 85.5 |
| | Azathioprine | 24 | 38.7 |
| | Steroids | 60 | 96.8 |
| | Chloroquine/Hydroxychloroquine | 8 | 12.9 |
| | Mycophenolate Mofetil | 7 | 11.3 |
| | Cyclophosphamide | 7 | 11.3 |
| | Sulfasalazine | 3 | 4.8 |
| **Treamnet duration of RA-ILD** | Less than one year | 12 | 19.4 |
| | Greater than one year | 50 | 80.6 |

### 5.3 Serologic Marker Positivity and Titers in RA Patients with ILD

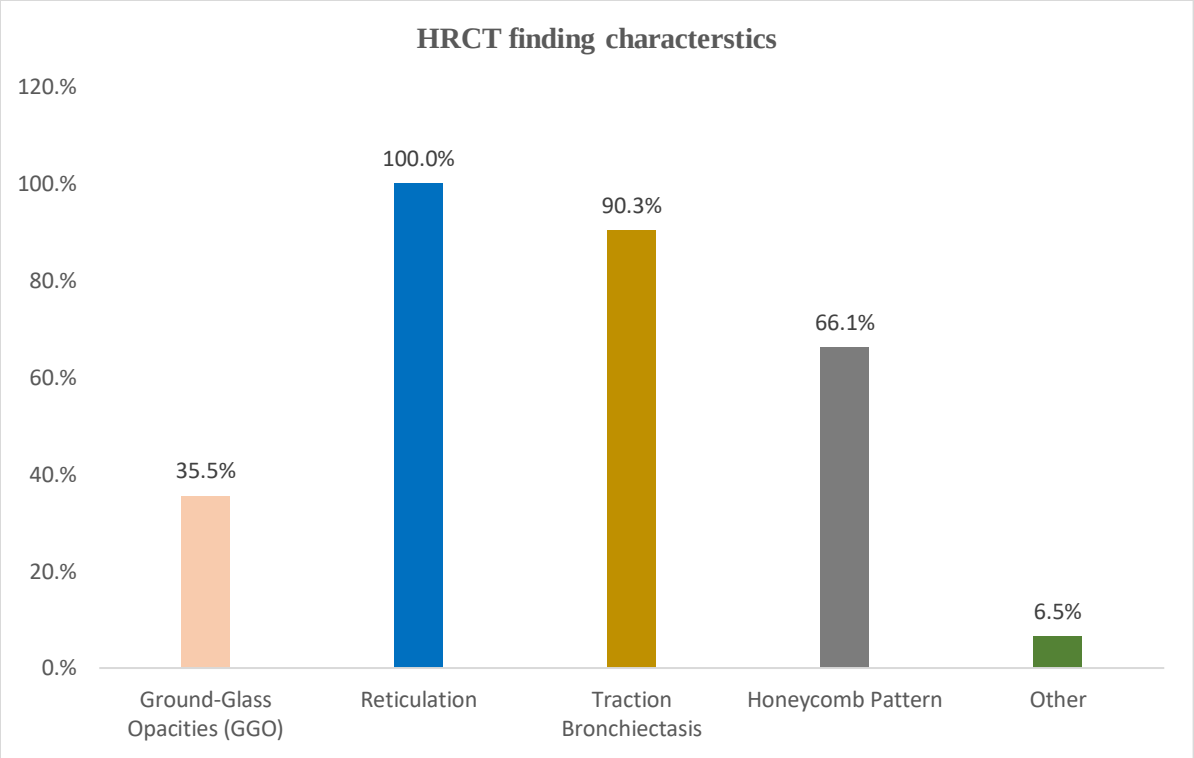
A total of 52 out of 62 patients (83.9%) had documented Rheumatoid Factor (RF), with a median RF titer of 232 (IQR: 104-280). Among these, 43 patients had a titer above 1:80, and 9 patients had a titer exceeding 1:320. Additionally, 55 out of 62 patients (88.7%) had documented anti-cyclic citrullinated peptide antibodies (ACCP), with a median titer of 500 (IQR: 460-750). Of these 55 patients, 52 patients had a titer above 1:20, and 50 patients had a titer above 1:100. Three patients had ACCP positive but RF-negative.

## 5.4 High-Resolution Chest CT of RA Patients with ILD

The major HRCT characteristics of the study participants include reticulation (100%), indicative of fibrosis, traction bronchiectasis (90.3%), and honeycombing (66.1%) as signs of advanced fibrosis. Other less common features include reticular opacity and bullae (3.2% each) (Figure 1). The final high-resolution CT (HRCT) patterns in interstitial lung diseases (ILDs) demonstrate that more than two-thirds of patients (68%) exhibit a Usual Interstitial Pneumonia (UIP) pattern, while the remaining one-third (32%) show a Non-specific Interstitial Pneumonia (NISP) pattern.

Only 8 patients had documented CXR findings, with 2 showing unremarkable results, while 6 had abnormalities, including bilateral reticulations (3 patients), patchy air space opacities (2 patients), and right minimal pleural effusion (1 patient).

Figure 2: High-Resolution Chest CT Findings in RA Patients with Interstitial Lung Disease (ILD) in Selected Hospitals in Addis Ababa




## 5.5 Pulmonary function tests

Pulmonary function tests, specifically Forced Expiratory Volume in 1 Second (FEV1) and Forced Vital Capacity (FVC), were recorded in only 20 (32.23%) of the patients. The median FEV1 was found to be 47.0%, with an interquartile range (IQR) spanning from 26% to 72%. Similarly, the median FVC was 62.0%, with an IQR ranging from 26% to 68.75%. Based on these results, all patients were diagnosed with restrictive pulmonary disease, as indicated by the low values of both FEV1 and FVC.

## 5.6 Outcome, quality of Life, other related findings

The Health-Related Quality of Life (HRQoL) was assessed by summarizing eight parameters: dressing and grooming, arising, eating, walking, hygiene, reach, grip, and activities. According to the table, 62.9% of patients reported mild to moderate quality of life impairment (HRQoL score 0-1), and 37.1% experienced moderate to severe quality of life impairment (HRQoL score 1-2). Of the patients, 61.3% had moderate to severe disease activity based on DAS28-ESR scores. Pulmonary complications were also significant, with 56.4% of patients experiencing moderate to severe dyspnea (mMRC score). Nearly half of the patients had a history of ILD exacerbation (46.8%) or hospital admissions (41.9%). Pain was another major issue, with 33.8% of patients

reporting severe to very severe pain. More than two-thirds (61.3%) of the patients had poor treatment outcome and the mortality rate was 11.3%.

Table 4: Outcome, quality of Life, other related findings of RA Patients with ILD in Selected Hospitals in Addis Ababa, Ethiopia, 2025.

| **Variables** | | **Count** | **Percentage** |
|---|---|---|---|
| DAS28-ESR | Remissions | 4 | 6.5 |
| | Low disease activity | 4 | 6.5 |
| | Moderate disease activity | 25 | 40.3 |
| | Sever disease activity | 13 | 21.0 |
| Health-Related Quality of Life (HRQoL) | Mild to moderate disability(0-1) | 39 | 62.9 |
| | Moderate to severe disability(1-2) | 23 | 37.1 |
| | Severe to very severe disability(2-3) | 0 | 0 |
| Subjective pain score | Mild pain (1-25%) | 31 | 50.0 |
| | Moderate pain (26-50%) | 10 | 16.1 |
| | Severe pain(51-75%) | 11 | 17.7 |
| | Very severe pain ( 76-100%) | 10 | 16.1 |
| Subjective health score | Poor health(1-25%) | 4 | 6.5 |
| | Fair health(26-50%) | 25 | 40.3 |
| | Good health(51-75%) | 13 | 21.0 |
| | Excellent health(76-100%) | 20 | 32.3 |
| mMRC Dyspnea | Mild dyspenea | 27 | 43.5 |
| | Moderate and above | 35 | 56.4 |
| Admission and exacerbation | History of admission | 26 | 41.9 |
| | History Exacerbation | 29 | 46.8 |
| Survival status | Alive | 55 | 88.7 |
| | Death | 7 | 11.3 |

## 5.7 Factors Associated with Poor Treatment Outcome of RA-ILD Patients

Variables that demonstrated an initial association ($P \leq 0.25$) in the COR analysis were considered for further inclusion in the adjusted model. The variables meeting this selection criterion and included in the adjusted model were fatigability ($P = 0.06$), rheumatoid factor (RF) positivity ($P = 0.03$), longer duration of ILD treatment ($P = 0.09$), DAS-28 ESR (Disease Activity Score) ($P = 0.07$), subjective pain score ($P = 0.01$), and methotrexate use ($P = 0.09$).

While no variables reached statistical significance (P<0.05) likely due to the small sample size, clinically significant trends were observed: Specifically, fatigability (AOR = 2.60, P = 0.21) suggested that patients reporting fatigue had 2.6 times higher odds of poor treatment outcomes, while RF positivity (AOR = 3.41, P = 0.15) indicated that RF-positive patients may have up to 3.4 times higher odds of poor outcomes. Subjective pain score (AOR = 1.55, P = 0.24), longer ILD treatment duration (AOR = 4.47, P = 0.12) and DAS-28 ESR (AOR = 1.77, P = 0.15) both showed trends toward an increased likelihood of poor outcomes. Methotrexate use (AOR = 0.10, P = 0.06) also suggested potential associations, with its use indicating a 90% reduction in the odds of poor treatment outcomes.

Table 5. Univariate and Mutivaraiable analysis of factors for poor treatment outcome of RA patients with ILD in slected hospital In addis Ababa , 2025

| **Variables** | **COR(95%CI)** | **P-Value** | **AOR(95%** | **P-Value** |
|---|---|---|---|---|
| Curent age | 1.03(0.99,1.08) | 0.18 | 0.97(0.88,1.07) | 0.54 |
| Age at RA diagnosis | 1.03(0.98,1.07) | 0.23 | 1.04(0.94,1.14) | 0.49 |
| Has fatigability | 2.69(0.94,7.71) | 0.06 | 2.60(0.58,11.58) | 0.21 |
| RF postivity | 4.81(1.10,20.92) | 0.03 | 3.41(0.63,18.41) | 0.15 |
| Longer duration ILD rx | 3.93(0.78,19.80) | 0.09 | 4.47(0.67,29.74) | 0.12 |
| DAS 28 ESR | 1.61(0.96,2.68) | 0.07 | 1.77(0.82,3.85) | 0.15 |
| Subjective pain score | 2.06(1.19,3.57) | 0.01 | 1.55(0.75,3.24) | 0.24 |
| Methotrexate | 0.16(0.02,1.39) | 0.09 | 0.10(0.01,1.06) | 0.06 |

## 6. Discussions

This study evaluated the clinical, imaging, and laboratory features of RA-ILD patients in Addis Ababa, Ethiopia. The most common symptoms were cough (93.5%), fatigue (43.5%), and dyspnea (35.5%). Most patients were positive for rheumatoid factor (83.9%) and anti-CCP antibodies (88.7%). HRCT showed reticulation in all patients and traction bronchiectasis in 90.3%, with 68% having a UIP pattern. All patients had restrictive pulmonary disease, and 61.3% had poor treatment outcomes. The mortality rate was 11.3%. No significant associations with poor outcomes were found, likely due to the small sample size.

The predominance of cough in this cohort contrasts with global literature, where dyspnea and fatigue are often reported as primary symptoms (24, 26). This discrepancy may reflect delayed diagnosis in Ethiopia, where patients present at advanced stages of fibrosis, leading to chronic cough as a consequence of established lung damage. The lower prevalence of dyspnea (35.5%) compared to Western cohorts (1, 14) could indicate underrecognition of early symptoms or adaptation to gradual functional decline in resource-limited settings.

The elevated rates of RF and anti-CCP align with studies linking these autoantibodies to RA-ILD severity and progression (9, 21). These findings exceed rates reported in other African cohorts (e.g., 3% seropositivity in Zanzibar (12)), suggesting a stronger autoimmune-driven pathogenesis in this population. The near-universal seropositivity underscores their potential role as biomarkers for RA-ILD risk stratification in Ethiopia, particularly where advanced diagnostics are scarce.

The universal presence of reticulation confirms the fibrotic nature of RA-ILD in this cohort, consistent with HRCT patterns described globally (21, 24, 27, 28). Traction bronchiectasis, a hallmark of advanced fibrosis, was prevalent (90.3%), highlighting delayed diagnosis due to limited access to HRCT in Ethiopia. These findings emphasize the urgent need for earlier screening in high-risk RA patients to mitigate irreversible lung damage.The predominance of UIP (68%), a subtype associated with rapid progression and poor prognosis (23–25), likely explains the cohort's high mortality rate (11.3%). This contrasts with studies reporting higher rates of NSIP in other populations (19–21), suggesting potential regional differences in disease phenotype or genetic susceptibility. The aggressive fibrotic course observed here underscores the need for antifibrotic therapies, which are largely inaccessible in Ethiopia (5).

All patients exhibited restrictive defects on PFTs, aligning with RA-ILD's characteristic physiologic impairment (23, 27). However, the universal presence of restriction suggests advanced disease at diagnosis, likely due to limited access to routine PFTs in Ethiopia. This finding stresses the importance of integrating basic PFTs into RA care to enable earlier detection and intervention. Over one-third of patients reported significant quality of life (QoL) impairment, reflecting the compounded burden of chronic pain, fatigue, and respiratory limitations. This aligns with studies linking RA-ILD to reduced QoL (17), but the magnitude may be exacerbated in Ethiopia by limited access to disease-modifying therapies and palliative care (5).

The high rate of poor outcomes and mortality exceeds global averages (34–36, 43), likely due to reliance on corticosteroids and conventional DMARDs, which inadequately target fibrosis (5). The mortality rate (11.3%) mirrors cohorts with untreated UIP, emphasizing the unmet need for antifibrotics (e.g., pirfenidone) and biologics in Ethiopia. Lessons from Zanzibar, where rituximab improved outcomes (12), suggest targeted therapies could mitigate this burden if made accessible.

The lack of significant associations contrasts with established predictors such as UIP, low DLCO, and high disease activity (34–36, 43). This may reflect the cohort's homogeneity (e.g., widespread advanced fibrosis) or limited statistical power due to sample size. Alternatively, unmeasured factors, such as genetic variants (e.g., rare *MUC5B* promoter polymorphisms in African populations (30–32)) or environmental exposures, may uniquely influence outcomes in this setting, warranting further study.

## 7. Strength and limitations

The study had several strengths. Firstly, it utilized a multicenter design, incorporating data from three major healthcare facilities in Addis Ababa, which increases the generalizability of the findings within the Ethiopian context. The use of structured data collection tools, including electronic health records and standardized questionnaires, ensured consistency and reliability in the data gathering process. Additionally, the inclusion of both high-resolution computed tomography (HRCT) scans and pulmonary function tests (PFTs) provided a comprehensive understanding of the clinical, imaging, and laboratory features of Rheumatoid Arthritis-associated Interstitial Lung Disease (RA-ILD) in the study population.

However, the study also had limitations. The retrospective design limited the ability to establish causality and observe long-term outcomes in real-time. A relatively small sample size may have reduced the statistical power of the study, making it harder to detect significant associations. The reliance on existing medical records also introduced the possibility of incomplete or missing data (incomplete PFT data, only 32% had results) , which could have affected the accuracy of the findings. Furthermore, the study did not have access to advanced antifibrotic treatments or biologic agents, limiting the ability to assess their effects on disease progression compared to other settings where such therapies are available.

## 8. Conclusions and recommendations

This study, the first of its kind in Ethiopia, found that RA-ILD patients presented with a variety of symptoms, including respiratory issues like cough, shortness of breath, and fatigue, as well as other systemic symptoms. Most patients tested positive for rheumatoid factor and anti-CCP antibodies. HRCT imaging revealed widespread lung damage, including fibrosis and traction bronchiectasis, with the majority exhibiting a UIP pattern.

Based on the study results, several recommendations can be made to improve the management of RA-ILD patients in Ethiopia. Early detection and routine screening for ILD should be prioritized, especially for RA patients with respiratory symptoms like cough, shortness of breath, and fatigue. Monitoring serological markers such as rheumatoid factor and anti-CCP antibodies, along with regular HRCT imaging, can help track disease progression. Given the poor treatment outcomes and high mortality rate, developing more effective treatment strategies for RA-ILD is essential. Future research with larger sample sizes and prospective designs is needed to evaluate treatment effectiveness and factors contributing to poor outcomes.

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# **Annex**:

This checklist is prepared for assessment of Clinical profile and outcome of patients with RA-ILD in Ethiopia.

Data collection date: _____
Name of data collector_____

Signature_____ Serial NO _____ card NO_____ Address_____

## Structured Questionnaire for Data collection

# Questionnaire

Part-I:- Socio-demographic Factors

1. Age of the patient
2. Age of onset of the RA symptom
3. Age of onset of ILD symptoms
4. Sex
   - ❑ Male
   - ❑ Female
5. Marital statues
   - ❑ Single
   - ❑ Married
   - ❑ Divorced
   - ❑ Widowed
6. Job
   - ❑ Student
   - ❑ Farmer
   - ❑ Teacher
   - ❑ Another governmental office
   - ❑ Unemployed
   - ❑ Factory worker
7. If factory worker please specify ----------

Part -2: Clinical manifestation

8. Clinical symptom
   - ❑ Cough
   - ❑ Decrease exercise tolerance
   - ❑ Dyspnea
   - ❑ Sputum
   - ❑ Hemoptysis

- ❑ Chest tightness
- ❑ Fatigue
- ❑ Asymptomatic
- ❑ others ----------

9. Physical finding
    - ❑ cyanosis
    - ❑ bilateral inspiratory coracle
    - ❑ wheeze
    - ❑ decrease lung sound
    - ❑ digital clubbing
    - ❑ loud P2
    - ❑ others------
10. Severe extra-articular manifestations
    - ❑ Vasculitis
    - ❑ Felty syndrome
    - ❑ Neuropathy
    - ❑ Serositis (Ascitis, Pleural effusion, Pericardial effusion)
    - ❑ Ocular involvement (Scleritis or episcleritis)
    - ❑ Glomerulonephritis
11. Diagnosis of ILD
    - ❑ at presentation
    - ❑ within 1 year
    - ❑ 1-5 years
    - ❑ > 5 years
12. Smoking history
    - ❑ Never smoker
    - ❑ Past smoker
    - ❑ Current smoker
13. History Tuberculosis treatment
    - ❑ Yes
    - ❑ No

14. Comorbid disease
    - ❑ Asthma
    - ❑ HIV
    - ❑ GERD
    - ❑ COPD
    - ❑ Others
15. Any treatment before the diagnosis of RA-ILD
    - ❑ If please specify the type of medication …….

Part-3: Serologic, CXR, HRCT, PFT finding

16. Serological finding
    - ❑ R.F
    - ❑ ACPA
    - ❑ If other please specify------
17. HRCT abnormality
    - ❑ Ground glass appearance
    - ❑ Reticular shadows
    - ❑ Traction bronchiectasis
    - ❑ Honeycombing
    - ❑ Reticulonodular opacities
    - ❑ Pleural effusion
    - ❑ Septal bullae
    - ❑ Diffuse alveolar opacities
18. Final HRCT conclusion
    - ❑ UIP
    - ❑ NSIP
    - ❑ OP
    - ❑ LIP
    - ❑ Other please specify ----------
19. Chest X-ray finding
    - ❑ ----------

20. Pulmonary function test finding

- ❑ FVC------
- ❑ FEV1…….
- ❑ FEV1/FVC ratio-----
- ❑ Restrictive pattern
- ❑ Obstructive pattern
- ❑ Mixed pattern

Part – 4: Treatment for RA

21. Type of treatment

- ❑ Azathioprine
- ❑ Methotrexate
- ❑ Leflunomide
- ❑ Cyclophosphamide
- ❑ Mycophenolate
- ❑ Rituximab
- ❑ Corticosteroid
- ❑ If other please specify

22. Duration of treatment before the onset of ILD

- ❑ < 1 year
- ❑ > 1 year

23. Part-5 DAS 28-ESR/CRP------

24. Outcome measures

- ❑ Admission to the hospital in the past 5 years due to ILD
- ❑ Number of acute exacerbations in the past 5 years
- ❑ Current symptoms

  Dyspnea score (mMRC Dyspnea Scale):0-4

  Cough

  Sputum production

  Hemoptysis
- ❑ Survival Status

Alive-------

Deceased-------if yes, cause of death--------

## Part VI: Health Assesment Questionnaire(HAQ-DI)

Please place an ‘x’in the box which best describes your abilities over the past week:

| | Without any difficulty | with some difficulty | with much difficulty | unable to do |
|---|---|---|---|---|
| **DRESSING & GROOMING** | | | | |
| Are you able to: | | | | |
| Dress yourself including shoelaces and buttons? | ☐ | ☐ | ☐ | ☐ |
| Shampoo your hair? | ☐ | ☐ | ☐ | ☐ |
| **ARISING** | | | | |
| Are you able to: | | | | |
| Stand up from a straight chair? | ☐ | ☐ | ☐ | ☐ |
| Get in and out of bed? | ☐ | ☐ | ☐ | ☐ |
| **EATING** | | | | |
| Are you able to: | | | | |
| Cut your own meat? | ☐ | ☐ | ☐ | ☐ |
| Lift a full cup or glass to you mouth? | ☐ | ☐ | ☐ | ☐ |
| Open a new milk carton? | ☐ | ☐ | ☐ | ☐ |

**WALKING**

Are you able to:

| | | | | |
|---|---|---|---|---|
| Walk outdoors on flat ground? | ☐ | ☐ | ☐ | ☐ |
| Climb up five stairs? | ☐ | ☐ | ☐ | ☐ |

**Please check any aids or devices that you use for any of the above activities:**

☐ Devices used for dressing ☐built up or special utensils ☐ crutches

(button hook,zipper pull etc) ☐ cane ☐ wheelchair

☐Special or built up chair ☐walker

**Please select any categories for which you usually need help from another person:**

☐ Dressing and grooming ☐ Arising ☐ Eating ☐ Waking

Please place an 'x'in the box which best describes your abilities over the past week:

| | Without any difficulty | with some difficulty | with much difficulty | unable to do |
|---|---|---|---|---|
| **HYGIENE** | | | | |
| Are you able to: | | | | |
| Wash and dry your body? | ☐ | ☐ | ☐ | ☐ |
| Take a tub bath? | ☐ | ☐ | ☐ | ☐ |
| Get on and off the toilet? | ☐ | ☐ | ☐ | ☐ |

**REACH**

Are you able to:

| | | | | |
|---|---|---|---|---|
| Reach and get down a 5 pound | | | | |
| Object (such as a bag of sugar) | ☐ | ☐ | ☐ | ☐ |
| From above your head? | ☐ | ☐ | ☐ | ☐ |
| Bend down to pick up clothing | | | | |
| from the floor? | ☐ | ☐ | ☐ | ☐ |

**GRIP**

Are you able to:

| | | | | |
|---|---|---|---|---|
| Open car doors? | ☐ | ☐ | ☐ | ☐ |
| Open previously opened jars? | ☐ | ☐ | ☐ | ☐ |
| Turn faucets on and off? | ☐ | ☐ | ☐ | ☐ |

**ACTIVITIES**

Are you able to:

| | | | | |
|---|---|---|---|---|
| Run errands and shops? | ☐ | ☐ | ☐ | ☐ |
| Get in and out of a car? | ☐ | ☐ | ☐ | ☐ |
| Do chores such as vacuuming or yard work? | ☐ | ☐ | ☐ | ☐ |

**Please check any aids or devices that you usually use for the above activities:**

☐ Raised toilet sits ☐ Bathtub bar ☐ Long handeled appliances for reach

☐ Bathtub sit ☐ Long handeled appliances in the bathroom ☐ Jar opener(for previously opened jars)

**Please check any categories for which you usually need help from another person:**

☐ Hygiene ☐ Reach ☐ Gripping and opening things ☐ Errands and chores

**Your activities** :to what extent are you able to carry out your everyday physical activities such as walking,climbing stairs,carrying groceries or moving a chair?

| Completely | mostly | moderately | a little | not at all |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ |

**Your pain**: how much pain have you had over the past week?

On a scale of 0 to 100(where 0 represents no pain and 100 represents severe pain)

Please record the number below

☐☐☐

**Your health**:please rate how well are you doing on a scale of 0 to 100(where 0 represents very well and 100 represents very poor health),please record the number below

☐☐☐

## የጤና ምዘና መጠይቅ(HAQ-DI)

አባክዎን ባለፈው ሳምንት የእርስዎን ችሎታዎች በተሻለ ሁኔታ የሚገልጽ"ⵝ" ሳጥን ዉስጥ ያስቀምጡ፤

| | ያለምንም መቸገር | አንዳንዴ መቸገር | ብዙ ጊዜ መቸገር | አለመቻል |
|---|---|---|---|---|

<u>መልበስ እና ንጽህናን መጠበቅ ትችላለህ፡</u>

ልብስ መልበስ፣የጫማ ማሰሪያዎችን እና ☐ ☐ ☐ ☐
ቁልፎችን ጨምሮ?

ጸጉርዎን በሻምፑ መታጠብ? ☐ ☐ ☐ ☐

<u>መነሳት ትችላለህ</u>

ከወንበር ላይ መነሳት? ☐ ☐ ☐ ☐

አልጋ ዉስጥ መግባትና መዉጣት? ☐ ☐ ☐ ☐

<u>መብላት ትችላለህ</u>

ለራስዎ ስጋ መቁረጥ? ☐ ☐ ☐ ☐

አንድ ሙሉ ኩባያ ወይም ብርጭቆ ☐ ☐ ☐ ☐
ወደ አፍዎ ማንሳት?

አዲስ የወተት ካርቶን መክፈት? ☐ ☐ ☐ ☐

<u>መራመድ ትችላለህ</u>

ጠፍጣፋ መሬት ላይ ከቤት ውጭ መራመድ? ☐ ☐ ☐ ☐

አምስት ደረጃዎች መውጣት? ☐ ☐ ☐ ☐

እባኮትን ከላይ ለተዘረዘሩት ተግባራት ብዙዉን ጊዜ የሚጠቀሙባቸዉን መሳሪያዎች ያረጋግጡ፤

☐ለመልበስ የሚያገለግሉ መሳሪያዎች ☐የተገነቡ ወይም ልዩ እቃዎች ☐ክራንች

☐የልብስ መቆለፊያ(የዚፕ መሳቢያ ወዘተ) ☐ሽመል(ከዘራ) ☐ተሽከርካሪ ወንበር

☐ልዩ የተገነባ ወንበር ☐ምርኩዝ(መራመጃ)

እባኮትን አብዛኛዉን ጊዜ ከሌላ ሰው እርዳታ የምትፈልግባቸዉን ምድቦች አረጋግጥ፤

☐ለመልበስ እና ንጽህና ለመጠበቅ ☐ለመነሳት ☐ለመብላት ☐ለመራመድ

| | ያለምንም መቸገር | አንዳንዴ መቸገር | ሁልጊዜ መቸገር | አለመቻል |
|---|---|---|---|---|
| ንጽህናህን መጠበቅ ትችላለክ ገላዎን መታጠብ እና ማድረቅ? | ☐ | ☐ | ☐ | ☐ |
| የመታጠቢያ ገንዳ ተጠቅሞ መታጠብ? | ☐ | ☐ | ☐ | ☐ |
| መጸዳጃ ቤት ገብቶ መውጣት? | ☐ | ☐ | ☐ | ☐ |

መድረስ ትችላለክ?

ባለ 5 ፓዉንድ የሚመዝን ነገር(ስኳር ያለው እቃ) ☐ ☐ ☐ ☐

ከጭንቅላትክ በላይ ማውረድ?

ከወለሉ ላይ ልብስ ለማንሳት ጎንበስ ማለት? ☐ ☐ ☐ ☐

መያዝ ትችላለክ

የመኪና በሮች መክፈት❓ ☐ ☐ ☐ ☐

ቀደም ብለዉ የተከፈቱ ማሰሮዎችን ይከፍታሉ❓ ☐ ☐ ☐ ☐

ቧንቧዎች መክፈትና መዝጋት❓ ☐ ☐ ☐ ☐

ምን መስራት ትችላለክ

ገበያ መውጣት እና መግዛት❓ ☐ ☐ ☐ ☐

መኪና ዉስጥ መግባትና መውጣት❓ ☐ ☐ ☐ ☐

የቤት ዉስጥ ስራዎችን መስራት❓ ☐ ☐ ☐ ☐

እባኮትን ከላይ ለተዘረዘሩት ተግባራት ብዙዉን ጊዜ የሚጠቀሙባቸዉን መሳሪያዎች ያረጋግጡ፤

☐ከፍያለ የሽንት ቤት መከመጫ ☐የመታጠቢያ ገንዳ ባር ☐ ረጅም እጄታ ያላቸዉ እቅዎች

☐የመታጠቢያ ገንዳ መከመጫ ☐በመታጠቢያ ቤት ዉስጥ ☐የጠርሙስ መክፈቻ

☐ረጅም እጄታ ያላቸዉ እቅዎች ☐ቀደምሲልለተከፈቱ ማሰሮዎች

እባኮትን አብዛኛዉን ጊዜ ከሌላ ሰው እርዳታ የምትፈልግባቸዉን ምድቦች አረጋግጥ፤

☐ንጽህናን ለመጠበቅ ☐ለመድረስ ☐ነገሮችን ለመያዝ እና ለመክፈት

☐ለቤት ዉስጥ ስራዎች

የእርስዎ ተግባራት እንደ መራመድ፣ደረጃ መውጣት፣ሸቀጣ ሸቀጦችን መያዝ ወይም ወንበር ማንቀሳቀስ የመሳሰሉ የእለት ከእለት እንቅስቃሴዎችን ምን ያህል ማከናዎን ይችላሉ?

| ሙሉ በሙሉ | በአብዛኛዉ | በመጠኑ | ትንሽ | አልችልም |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ |

ህመምዎ፤በለፈው ሳምንት ምን ያህል ህመም አጋጥሞታል?

ከ0እስከ100(ዜሮ ምንም ህመም የሚወክልበት እና 100 ከባድ ህመም የሚወክል ከሆነ)እባክዎ ከዚ በታች ቁጥሩን ይመዝግቡ

☐☐☐

ጤናዎ፡እባኮትን ከ0 እስከ 100(0 በጣም ጥሩ እና 100 በጣም ከባድ ህመምን ይወክላል)

እባክዎ ከዚ በታች ቁጥሩን ይመዝግቡ

☐☐☐

## Information Sheet

**Title of Research**: "Clinical Profile and Outcome Of Patients With Rheumatoid Arthritis Associated Interstitial Lung Disease In Ethiopia: A Multicentric, Five Year Retrospective Study."

**Name of Investigator**: Dr. Melese Mengistu Mengesha

**Objective of the study:** To assess the clinical manifestation, serologic findings and imaging findings and to identify factors associated with poor outcome.

**Selection criteria:** You are selected randomly among patients who had been diagnosed with RA-ILD at Tikur Anbessa, Lancet Specialized Internal Medicine and Surgical Center, and Rheum Rheumatology and Internal Medicine Specialty Clinic. If you decide to participate in the study you will be asked some Questions based the checklist that will be explained to you.

**Possible harm:** There is no risk you will be exposed to by participating in this study. It will take about 20 minute of your time for Interview.

**Confidentiality:** Your name and Personal identification will not be asked or included in the interview or study. Any part of the data collected in this study is confidential and will not be used for purpose other than this study. All information will be coded and data collection tools will be locked and will not be accessed by any individual.

**Autonomy:** You have the right to decide to participate in this study or not. You can also withdraw from participating at any point of the study. Deciding not participate in the study or withdrawal then after does not affect your treatment.

# Funding of the research

The research grant will be from Addis Ababa University, College of Health Science postgraduate office. The research proposal will be reviewed by research committee of internal medicine department and by institutional review board of AAU, CHS.

Contact address- Dr. Melese Mengistu Mengesha

Phone number: 0932675053

Email: mlsmengistu@gmail.com

# Informed consent form

Interstitial lung disease is one of the chronic complications of RA which causes dyspnea, functional impairment and other complications. It is treatable if detected early by HRCT is a simple and important diagnostic method. This study assesses the clinical manifestation serology and imaging finding the commonly seen in patient with RA-ILD. The information helps to identify patient with clinical manifestation to have proper imaging and early diagnosis. We kindly ask you to participate in this study by answering the questions listed in the check list, letting as review your medical chart and other investigations. All the information you give is confidential and you have the right to not participate or withdraw from the study at any point. We are delighted to answer any of your questions.

I have read (was read to me) and clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality, and the right of participating and withdraw from the study at any time.

**Participant Name: anonymous**

**Date**: _____**Time**: _____

**Confirmation**: "I verbally agreed to participate in the study after being informed of the purpose, procedures, risks, and benefits."

**Researcher**: Dr. Melese Mengistu

**Witness**: [Name, if applicable]

Name of Data collector _____ Signature of Data collector_____