



**St. Paul's Hospital
Millennium Medical College**
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DEPARTMENT OF INTERNAL MEDICINE

**PREVALENCE OF COMORBIDITIES IN RHEUMATOID
ARTHRITIS PATIENTS AT SAINT PAUL'S HOSPITAL
MILLENNIUM MEDICAL COLLEGE, ADDIS ABABA
ETHIOPIA.**

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**A THESIS SUBMITTED TO THE DEPARTMENT OF INTERNAL
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Prevalence Of Comorbidities in Rheumatoid Arthritis Patients at Rheumatology Clinic Saint Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia.

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ABBREVIATIONS AND ACRONYMS

ACPA	Anti-Citrullinated Peptide Antibodies
ACR	American College of Rheumatology
ARA	American Rheumatoid Association
bDMARDs	Biologic Disease-Modifying Antirheumatic Drugs
BLH	Black Lion Hospital
CRP	C Reactive Peptide Protein
CVD	Cardiovascular Disease
DAS	Disease Activity Score
DM	Diabetes Mellitus
DMARDs	Disease-Modifying Antirheumatic Drugs
ESR	Erythrocyte Sedimentation Rate
ETB	Ethiopian Birr
EULAR	European League Against Rheumatism
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HIV	Human immune virus
HTN	Hypertension
NSAID	Non-steroidal Anti-Inflammatory Drugs
RA	Rheumatoid Arthritis
RF	Rheumatoid Factor
SPHMMC	Saint Paul Hospital Millennium Medical College

ABSTRACT

Background: Rheumatoid arthritis is a chronic inflammatory disease that affects the quality of life and, if left untreated, increases morbidity and mortality. Comorbidity is common due to the disease process or secondary to the medication, and in Ethiopia, there is no study that addresses the prevalence of comorbidities in RA and disease characteristics, so this study will fill the knowledge gap, to provide appropriate screening and treatment of comorbidities in RA, and also it will be used as a baseline to conduct a large study.

Objective: The study aims to assess the prevalence of comorbidities in rheumatoid arthritis and disease characteristics at Saint Paul Millennium Medical College, from February to July 2022.

Methodology: A cross-sectional descriptive study was conducted on 103 rheumatoid arthritis patients who had follow-ups at the rheumatology clinic of Saint Paul Millennium Medical College hospital from February to July. A structured checklist was prepared in English with a translation into Amharic, with components of demographic data, clinical characteristics, and comorbidity. The collected data was entered into a computer using the Statistical Package for Social Sciences version 25.0 for Windows. Means, standard deviations, and percentages were calculated.

Results: In our study, females represented 81.6%, with a ratio of 4.4:1, and the mean (SD) age was 45.1 (12.9) years. RF-positive serology was in 73.8% and 99% of the patients were treated for less than 10 years. Screening was conducted for diabetes (76.7%), dyslipidemia (50.5%), HBV (34.9%), and HCV (35.9%). Comorbidity was found in 40.8%. Hypertension (28.2%) and dyslipidemia (22.3%) are the commonest comorbidities, while type 2 diabetes occurs in 10.1%, whereas obesity is 8.7%, hepatitis B virus 5.4%, depression 3.9%, and tuberculosis is 2.9%. A DMARD was used in 79.6% of cases, with 81.7% on a single DMARD. Among these, methotrexate was prescribed in 71.8% of the cases, followed by chloroquine in 22.3%. There was no biologics usage during the study period. Periodontal disease was found in 26.2%, whereas 15.5% of the patients had a positive family history of RA, and smoking was seen in 5.8%.

Conclusion: Hypertension is the most common prevalent comorbidity in RA, followed by dyslipidemia and diabetes consecutively, and screening for HCV, HBV, dyslipidemia, and diabetes is insufficient. Most of the patients are on a single DMARD. The impact of this study on future decision-making needs to be verified with multicenter, prospective studies by including other variables.

Key words: Comorbidity, Rheumatoid Arthritis, disease characteristics, Ethiopia.

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1. INTRODUCTION

1.1 Background

RA is a chronic inflammatory disease of unknown etiology characterized by a symmetric polyarthritis, and the most common form of chronic inflammatory arthritis¹. In 2010 ACR/EULAR revise the criteria of 1987 ARA to early detection and management into four classifications, with point scores for each: joint symptoms; serology (including RF and/or ACPA); symptom duration, whether <6 weeks or >6 weeks; and acute-phase reactants (CRP and/or ESR)² “In the new criteria set, classification as “definite RA” is based on the confirmed presence of synovitis in at least 1 joint, absence of an alternative diagnosis that better explains the synovitis, and achievement of a total score of 6 or greater (of a possible 10) from the individual scores in 4 domains: number and site of involved joints (score range 0–5), serologic abnormality (score range 0–3), elevated acute-phase response (score range 0–1), and symptom duration (2 levels; range 0–1)”³.

Comorbid conditions play a critical role in the management and outcomes of rheumatoid arthritis⁴. Depression, cardiovascular disease, osteoporosis, and hypoandrogenism are some of the comorbidities linked with RA, all of which contribute to disease morbidity. Some of these comorbidities are more common in RA patients as a result of the medications they take, particularly glucocorticoids⁵ immunosuppression with conventional DMARDs and biologics⁶ and classic risk factors including cigarette smoking. Chronically active inflammation, on the other hand, predisposes to the occurrence of these comorbidities⁷.

RA is common between the age of 25 and 55 and become plateaus until the age of 75 and then decreases and occurs more commonly in females than in males, with a 2–3:1 ratio¹. Interestingly, studies of RA from some of the Latin American and African countries show a predominance of disease in females compared to males, with ratios of 6–8:1^{1,8}. Family history, environmental factors like cigarette smoking, and periodontal disease are some of the associated risk factors.^{1,9–12}.

In general, the magnitude of comorbidity associated with RA is different in a different part of the world this might be from the difference in treatment, the disease duration or early detection of the associated comorbidity. For this reason, it is reasonable to conduct research on the prevalence of comorbidity in patient with RA so that, the knowledge gap is filled and according to the result institutional screening protocol might be formulated and/or further research might be recommended based on the finding.

1.2 Statement Of the Problem

RA is the prototypical chronic inflammatory rheumatic disease, affecting 5 to 10 per 1000 adults in industrialized countries¹⁰. Developing countries are challenged by an increase in the incidence of RA in the face of ongoing poverty, rampant infectious disease, and poor access to modern health care facilities¹.

RA is associated with an increased risk of premature mortality, predominantly due to increased CVD¹¹, and this is due to the late presentation in the course of their disease^{1,9}.

Infection risk remains a significant issue for the treatment of RA in developing countries because of the immunosuppression associated with the use of glucocorticoids and most DMARDs^{1,11}. Increase in the incidence of tuberculosis and high prevalence of hepatitis B, C and HIV in developing countries also poses challenges^{1,13}.

SPHMMC which is a referral Hospital in Addis Ababa and providing rheumatology care service to the public in separated rheumatology clinic. The demand is increasing and is supposed to increase with growing access of care for RA patients. The disease characteristics, the prevalence of risk factors, pattern of screening for comorbidities and the prevalence of comorbidities is not known in Ethiopia generally and at SPHMMC specifically and is supposed to be high due to late presentation and drugs being used. This demands wider understanding and handling of the comorbidities.

According to investigator's knowledge, there is no study conducted on the prevalence of comorbidities in RA patients in Ethiopia, so this study aims to fill the knowledge gap and pave the way for further research.

1.3 Significance Of the Study

Comorbidities contribute to the increase in mortality and morbidity and also decreases quality of life in RA patients but data is limited in Africa¹² and Ethiopia and hence, the findings of this study will be important to show the usually occurring comorbidity in Ethiopian RA patients at SPHMMC and to have screening measures in place to prevent and treat them in the future, thereby improving the quality of the treatment provided for our patients. Furthermore, the findings will be helpful to address the frequently happened comorbidity in resource limited setups in our country and elsewhere. Moreover, this study will help as a baseline study to conduct subsequent research and develop setup-based guidelines.

2. LITERATURE REVIEW

2.1 Prevalence of RA

RA affects around 0.5–1% of the adult population worldwide. Geographic location, internationally, and among ethnic groups within a country influence the incidence and prevalence. Some studies have found a high incidence of about 7% among the Native American Yakima, Pima, and Chippewa tribes of North America, but many population studies from Africa and Asia have found a lower prevalence of 0.2–0.4%¹.

There are no real-life contemporary estimates of the prevalence of RA in sub-Saharan Africa¹⁰ age standardized prevalence rates of 135.7 to 231.1 per 100,000 sub-Saharan African population were generated from statistical modelling for the Global Burden of Disease study^{12,13}.

In 1975, a South African study found a prevalence of RA of 0.90 percent in an urban Black population and 0.12 percent in a rural Black population¹⁴. This was comparable to the 1% prevalence of RA found in most parts of the world¹³. Other studies with higher sample sizes revealed prevalence of 0.29 percent in Egypt⁹ and 0.60 percent in the Democratic Republic of Kongo¹⁵, which are consistent with observations in other regions of the world, where as prevalence of 0.4% in most low- and middle-income rural populations¹⁶. A study of 52,504 Algerian city dwellers found a low frequency of 0.13 percent¹⁷.

2.2 Prevalence Of Comorbidity

Study from developed nation also showed there was significant comorbidity in patients who were diagnosed with RA, according to Balsa, Spanish cross-sectional, observational the prevalence of at least one or more comorbidity was 22%, the most frequent being depression 27% and obesity 26% followed by myocardial infarction and stroke which was observed in 5% and 1% of patients, respectively. While hypercholesterolemia was found in 46%, hypertension in 41% and smoking in 25% of RA patients¹⁸.

According to Norton et.al study from UK showed baseline comorbidities and extra-articular characteristics, prevalence was 31.6 % and 8.6 %, respectively. Those patients have, on average 0.9 comorbidities at baseline, 1.8 and 2.3 average comorbidities at 5 and 10 years, respectively.

The most common baseline comorbidity was hypertension, and with high incidence of IHD was found after 15 years of treatment ¹⁹.

According to study from south Korea the most frequently associated comorbidities in patients with RA included hypertension which accounts for 30.3%, followed by osteoarthritis 22.6%. The magnitude of dyslipidemia was 14.1%, diabetes 12.9%, depression 11.2%, pulmonary tuberculosis 8.6%, thyroid disease 8.0%, asthma 7.3%, and myocardial infarction or angina 5.7%. Hepatitis B and hepatitis C was found in 2.9% and 0.4% respectively ²⁰.

In another Korean study the prevalence of hypertension was found to be 37.6% and diabetes was 18.6% while the magnitude of hypercholesterolemia was 15.9%. The prevalence of hepatitis B, hepatitis C and depression was 2.2%, 1% and 4.2% respectively ²¹.

Another cross sectional study from Saudi Arabia showed 66% patients had at least one comorbidity and hypertension was the most common comorbidity, accounting for 35.9%, DM 30.9%, osteoporosis 25.8%, and dyslipidemia in 19.4% ¹¹.

Study from South Africa by Botha-Scheepers found that the mean age at diagnosis was 57.6 years, with female predominance of 86.7 percent, Comorbidity was frequent in patients with RA with one comorbidity in 69%, two in 40%, three in 26%, four in 13% and five in 2% of the patients, with the most frequently observed comorbid diseases were hypertension (45.5%), tuberculosis (11.1%), Type 2 DM (10.9%) and osteoarthritis (10.9%). Other diseases includes hypercholesterolemia (7.1%)⁷. Another south African retrospective study showed the most frequent comorbid conditions were; chronic pulmonary disease, diabetes, cerebrovascular disease, tumor, congestive heart failure, peripheral vascular disease and renal disease ²².

The retrospective study from south Africa by Vikash Lala et.al, showed 98% had ≥ 1 comorbidities. The commonest comorbidities was hypertension (70%) and hypercholesterolemia (47%) which was followed by type 2 diabetes (T2D) occurring in 15.4%, history of tuberculosis in 10.6% and clinical cardiovascular events were rare (0.6%)²³.

According to study in Egypt, the prevalence of hypertension leads among the comorbidity which accounted in 25%, depression 10.4%, DM 11.4%, HCV 6.8% and IHD 3.2%⁴.

2.3 Sociodemographic Status, Disease Characteristics and Risk Factors Of RA

RA should be regarded as a condition associated with higher risk for CV disease due to both an increased prevalence of traditional risk factors and the inflammatory burden and is recommended to screen the patient on the annual basis with FBS, Lipid panel and BP. Usage of NSAIDs needs further evaluation in CV risk so judicious prescription is recommended, especially for patients with a documented CV disease or in the presence of CV risk factors and Corticosteroids is recommended at the lowest possible dose²⁴.

RA increases between 25 and 55 years of age, after which it plateaus until the age of 75 and then decreases and occurs more commonly in females than in males, with a 2–3:1 ratio¹. Interestingly, studies of RA from some of the Latin American¹ and African countries show an even greater predominance of disease in females compared to males, with ratios of 6–8:1^{1,8}.

According to Balsa, Spanish cross-sectional, observational study of 200 patients showed the mean age at diagnosis was 58 years, female sex was 79% and 8.5% of RA patient were smokers. Secondary school and University level of education is 46.5% while 35% was currently employed and mean RA duration of 10.3 years. DMARD was used in 94.5% Patients in this study during the study period and the mean number of DMARD was 2.8 and among the commonly prescribed drug methotrexate leads by 74.5%, prednisolone was the second frequently prescribed non DMARD medications with 52.5% while the usage of Biologics was found to be 36.5% and NSAIDs usage in previous three month was 56%¹⁸.

According to Norton et.al study from UK the mean age was 55.3, with female predominance with 2:1 ratio. The low level of education and low social class was found in 36.3% and 42.3% respectively, while previous or current smokers consists of 21.9% and 46.3% are currently working. The median number of swollen joints, tender joint and erythrocyte sedimentation rate was 15, 10 and 38 respectively. Among the studied group 73.1% was found to have RF positive and the magnitude of patient that ever used methotrexate was 41%¹⁹.

According to study from south Korea mean age of patients was 57.5 years and female accounts for 76.9% and prevalence of current/previous smokers was 28.3% with current smoker of 9.8%. The educational level of university and graduate school was 14.8% and 24.5%²⁰.

In another Korean study the mean age of patients and duration of illness was 56 and 7.3 years respectively. Female accounts for 83.1% and the prevalence of current smokers is 11.5%. University and graduate school level of education was 24% whereas, 29.2% was employed. Methotrexate were used in 89.5% of patients followed by steroid 73.99% and biologics is rarely used (5.78%) and NSAID in previous three months was utilized in 81.03%²¹.

According to Indian study by Chandrashekara, the mean age was 48.98 with male-to-female ratio of 1:5. Among tested subjects, 85.2% and 79.1% were positive for rheumatoid factor (RF) and Anti-citrullinated protein antibody (ACPA) respectively. One or more comorbidities was found in 40.3% of patients and majority of the patients were treated with double DMARDs. The commonly used double DMARD combination was methotrexate and hydroxychloroquine (60.7%), and around 10.7% of patients had received biologics and none were on active treatment with biologics at the time of study²⁵.

Another cross-sectional study from Saudi Arabia found the mean age at diagnosis was 53.3 years, with female consisting of 78%, and RF was positive in 76.1% with 33% of the patients was diagnosed before five years and 34% of the patient had the disease for the last 6-10 years. Patients were prescribed frequently with DMARDs and methotrexate was used in 74.4% being the most common, followed by Sulphasalazine 35.3% and chloroquine was used in 32.3 and biological agents were administered in 41.5% of the patients and commonly prescribed drug was Rituximab¹¹.

Study from South Africa by Botha-Scheepers found that the mean age at diagnosis was 57.6 years, with female predominance of 86.7%, and RF and ACPA were positive in 85.1% and 80.4% respectively. Around 2/3 of the patients were given DMARDs, and methotrexate (72%) was commonly prescribed which is followed by chloroquine (67%) and Sulphasalazine (6%). Biological agents were administered in only 1% of the patients⁷.

Another Retrospective study on Comorbidities in Black South Africans with established rheumatoid arthritis by Vikash Lala et.al, showed most of the patients were female (87%) with mean (SD) age and disease duration of 60 (11.1) and 10.7 (5.0) years respectively, the positivity of rheumatoid factor and ACCP was 91% and 81% respectively. The Commonly prescribed medications were NSAIDs (98.8%) and methotrexate (95.4%). Other DMARDs including sulfasalazine, leflunomide and chloroquine was also used and low-dose oral prednisone was prescribed in 85.8%. Only 3.6% of patients were treated with biologics²³.

Another study in Egypt showed most of the patients were female 85.1% with mean (SD) age and disease duration of 47.5 (11.2) and 8.3 (6.7) years respectively. Active smokers were found to be 7.1% and educational level of university was 19.5% and 24.7 % was employed during the study period. Methotrexate was used in 94.5% followed by steroid 58.4% and biologics is rarely used 7.1% and NSAID in previous three months was utilized in 65.9%⁴. study at BLH, Ethiopia the commonly prescribed medications are methotrexate (97%), prednisolone(92%) and chloroquine (40%) and other type of DMARDs and biologics were not prescribed and hepatitis serology was done in 90% of patients²⁶.

The likelihood that a first-degree relative of a patient will share the diagnosis of RA is 2–10 times greater than in the general population¹. Twin study shows fourfold increased concordance in monozygotic twins compared with dizygotic twins. Data from both Finnish and English twins study suggest that approximately 50–60% of the occurrence of disease in the twins is explained by shared genetic effects ²⁷.

In addition to genetic predisposition, a host of environmental factors have been implicated in the pathogenesis of RA. The most reproducible one is cigarette smoking which confers a relative risk for developing RA of 1.5–3.5. In particular, women who smoke cigarettes have a nearly 2.5 times greater risk of RA, a risk that persists even 15 years after smoking cessation. A twin who smokes will have a significantly higher risk for RA than his or her monozygotic co-twin, theoretically with the same genetic risk, who does not smoke ^{1,28}.

Another environmental risk factor for RA is periodontal infection, which shows a significant association with RA in many systemic reviews and meta-analysis studies ^{29,30}. According to Potikuri et al. Periodontal disease was present in 64.83% (59/91) of RA patients and in 28% of healthy controls (26/93) ³¹. According to Pischon et al. study on 57 RA subjects, individuals with RA had a significant 8.05-fold increased odds (95% confidence interval: 2.93 to 22.09) of periodontitis compared to controls ³².

2.4 Proposed conceptual framework

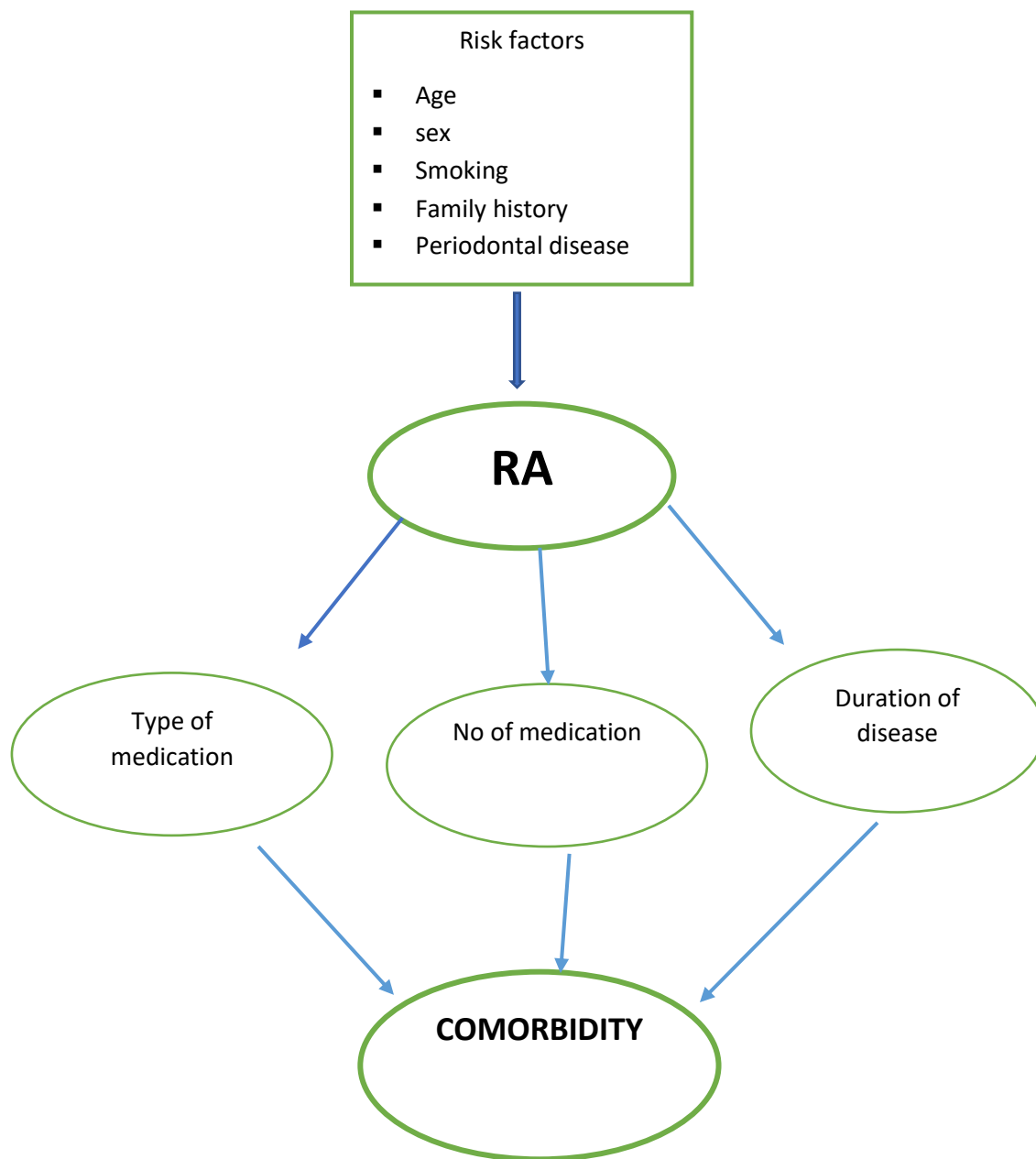


Figure 1: Conceptual framework of comorbidities in RA and associated risk factors, Developed by investigator from the available literature, November 2022

3. OBJECTIVES

3.1 General Objective

To determine the prevalence of comorbidities in rheumatoid arthritis and at Saint Paul's Hospital Millennium Medical College Rheumatology clinic, Addis Ababa, Ethiopia, 2022.

3.2 Specific Objective

1. To determine the magnitude of comorbidity in rheumatoid Arthritis patients at Saint Paul's Hospital Millennium Medical College Rheumatology clinic, Addis Ababa, Ethiopia, 2022.
2. To determine the screening practice for comorbidities in rheumatoid arthritis patients at Saint Paul's Hospital Millennium Medical College Rheumatology clinic, Addis Ababa, Ethiopia, 2022.
3. To determine the prevalence of known risk factors in rheumatoid arthritis patients at Saint Paul's Hospital Millennium Medical College Rheumatology clinic, Addis Ababa, Ethiopia, 2022.
4. To determine the disease characteristics of rheumatoid arthritis patients at Saint Paul's Hospital Millennium Medical College Rheumatology clinic, Addis Ababa, Ethiopia, 2022.

4. METHOD OF STUDY

4.1 Study Area

This research was done at the SPHMMC Rheumatology Clinic in Addis Ababa, Ethiopia, which is one of the main tertiary referral hospitals in the country and is run by the federal ministry of health. The hospital was constructed during the Emperor Haile Selassie regime in 1961 with the goal of giving health care to those who can't pay. It serves a population of more than 5 million people in its catchment area. In 2007, a medical college was added, and there are now over 13 departments. One of them is the department of internal medicine, which is divided into several subspecialties. SPHMMC has various outpatient services, including a rheumatology clinic. Rheumatology clinic is delivering service for rheumatologic illness, such as RA, SLE, GA, Scleroderma and Sjogren syndrome, twice per week with the service delivered by two consultant Rheumatologist and One Internist and attaching Internal medicine Residents having a patient flow of 20-30 patients per visit with appointment been given by physician according to the severity of illness with the maximum duration of 3 months.

4.2 Study Period

The study was conducted from February 2022 to July 2022

4.3 Study Design

A cross sectional descriptive study design was conducted.

4.4 Population

4.4.1 Source population

All patients who had follow up in rheumatology clinic at SPHMMC.

4.4.2 Study population

All RA who had follow up in rheumatology clinic at SPHMMC and who fulfilled the inclusion criteria.

4.5 Inclusion And Exclusion Criteria

4.5.1 Inclusion criteria

All Rheumatoid arthritis patients who were diagnosed by physician.

4.5.2 Exclusion criteria

Those patients with concomitant other rheumatologic illness and patient who are not started on the treatment.

4.6 Sample Size

All rheumatoid arthritis patients who were on follow up during the study period at SPHMMC.

4.7 Data Collection Method and Tools

4.7.1 Data collection instruments and measurements

Data were collected from February 1 to July 30, 2022 G.C. The questionnaire was adopted from different literatures. The questionnaire of socio demographic status including job status, education level and smoking history was adopted from EDHS. The data collecting checklist that included components such as the patient's age and sex, family history, periodontal disease, and other laboratory investigation was used. It was based on a review of records previous to the study period and similar literatures used in this investigation.

4.7.2 Data collection procedure

An hour-long training was given to 2 data collectors on the components of the questionnaires and checklist, how to fill the data and the importance of the study. Data on socio demographic and clinical characteristics of the study participant was collected by interviewing the patient and the other laboratory, imaging results and type of medication was collected using document review by data collector.

4.7.3 Data Collectors

Records of the study population was assessed for completeness before data entry and the entered data will be checked by the data supervisor on a daily basis for any incompleteness and/or inconsistency by principal investigator for completeness. The principal investigator had supervisory role.

4.7 Study Variables

4.7.1 Dependent variable

- ❖ Comorbidity

4.7.2 Independent variables

- Socio demographic factors: Age, Sex, Family history, Smoking status
- Treatment related: Drug being administered, number of medications, Duration of treatment.

4.8 Operational Definitions

Comorbidity: the co-occurrence of more than one disorder in the same individual in this study it includes DM, Dyslipidemia, HTN, IHD, Infection, Tuberculosis, HBV and HCV.

Depression: only if the patient was diagnosed with the disease and needed regular psychiatrist visit.

DM: defined fasting blood sugar >125 mg/dl, OR HgA1c >6.5 %, or those who started on treatment of DM³³.

Dyslipidemia: The patient was considered to be suffering from dyslipidemia if the patient was on treatment with statin, total cholesterol was >240 mg/dL and triglyceride >200 mg/dL based on NCEP guidelines or was managed by a cholesterol lowering drug based on a previous assessment³⁴.

Hypertension: a Patients with a value greater than 140/90 mmHg/ patient who started on management will be considered as hypertensive³⁵.

Low dose and High dose corticosteroid: patients on prednisolone <10mg daily and ≥ 10mg daily respectively.

Smoker: a patient who has history of smoking of > 100 cigarettes in his life time.

Weight : underweight (BMI < 18.5 kg/m²), overweight (BMI 25 to <30 kg/m²) and obesity categories (class I: 30 to <35 kg/m²; class II: 35 to <40 kg/m²; and class III: ≥40 kg/m²)³⁵.

Periodontal disease: patient self-reported history of treatment for gingival illness before the diagnosis of RA.

Rheumatologic illness: any conditions that affect the joints, tendons, muscle, ligaments, bones, and muscles including include osteoarthritis, gouty arthritis, systemic lupus erythematosus, Sjogren syndrome and scleroderma.

4.9 Data Management and Analysis

Data were entered in to epi-data and exported to be analyzed by using the Statistical Package of Social Sciences (SPSS) version 25.0 for Microsoft Windows. Means, standard deviations, percentages and ratios was calculated. The results were presented by use of charts, tables and texts.

4.10 Data Quality Control

To ensure the quality of data, preceding data collection, training of the data collectors was given for one day by the principal investigator on the objective, relevance of the study and confidentiality of information.

Pretest was done by taking 5% total sample size, two weeks before actual data collection to check its variability and the questionnaire was assessed for its clarity, length and completeness and the necessary correction was done accordingly.

4.11 Ethical Consideration

Ethical clearance was obtained from institutional review board of St Paul's Hospital Millennium Medical College. Patients was informed about the aim, benefit and possible inconvenience of the study. They were assured the information collected will be confidential. Before data collection begins, verbal consent was obtained and participants were told to withdraw at any time if the need arise.

4.12 Dissemination Of Results

The findings of the study will be submitted to the department of internal medicine. It will be presented as one of the partial fulfillments of specialty certificate in internal medicine. All efforts will be made to publish the results to the local and international journals and to present it in national scientific conferences.

5. RESULTS

5.1 Sociodemographic Characteristics

In our study, the total number of patients with diagnosed RA at rheumatology clinic was 118 patients. Of this 103 (87.3%) fulfilled the inclusion criteria were studied during the stated study period. Females accounted for 81.6% (n=84) with female to male ratio of 4.4:1. The mean age was 44.1 years (SD = 12.9). The distribution of age-group of patients is depicted in the table1 below. More than half of patients (n=56, 54.5%) were unemployed.

Table1: Sociodemographic characteristics of Rheumatoid Arthritis patients at SPHMMC, Addis Ababa, Ethiopia from February 2022 to July 2022

Characteristics		Frequency, n	Percent, %
Sex	Male	19	18.4
	Female	84	81.6
Educational status	No formal education or attended some elementary school	31	30.1
	Complete elementary school	26	25.2
	High school diploma	25	24.3
	University graduate	21	20.4
Employment status	Government employee	22	21.4
	Private business/worker	25	24.3
	Unemployed	56	54.4
Monthly income	2,500 ETB or less	59	57.3
	> 2,500 – 5,000 ETB	28	27.2
	>5,000 ETB	16	15.5

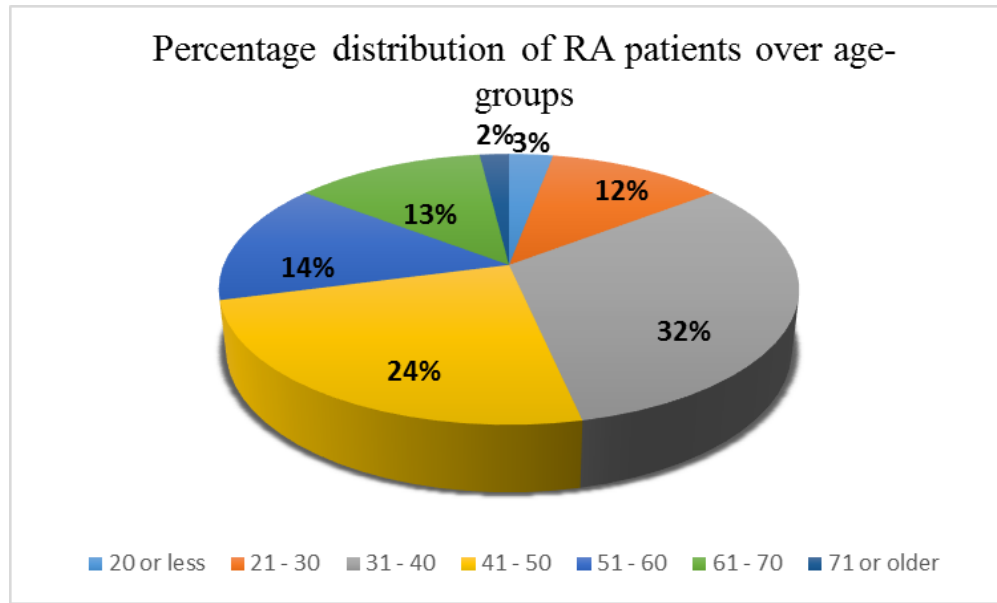


Figure 1: Age distributions of patients with Rheumatoid arthritis who visited rheumatology outpatient clinic of SPHMMC, Addis Ababa, Ethiopia from February 2022 to July 2022.

5.2 Frequency Of Known Risk Factors and pattern of screening for comorbidities.

Periodontal disease was found in 26.2% of patients (table 2) and Echocardiography was done only for 24.2% of patients while screening for HCV and HBV was done in 34.95% and 35.9%, respectively (table 3).

Table 2: Frequency of known risk factors associated with rheumatoid arthritis among patients who visited Rheumatology outpatient clinic at SPHMMC, Addis Ababa, Ethiopia from February 2022 to July 2022.

Known Risk factors		Number	Percentage
Cigarette smoking habit	Yes	6	5.8
	No	97	94.2
Family history	Yes	16	15.5
	No	87	84.5
History of periodontal disease prior to the diagnosis with RA	Yes	27	26.2
	No	76	73.8

Table 3 Patterns of screening for comorbidities in rheumatoid arthritis patients who had follow up at Rheumatology outpatient clinic at SPHMMC, Addis Ababa, Ethiopia from February 2022 to July 2022.

Comorbidities	Patient screened (n)	Percent (%)
Hypertension	100	100
Obesity	100	100
Diabetes Mellitus	79	76.7
Dyslipidemia	52	50.5
HBV Infection	37	35.9
HCV infection	36	35
Cardiac disease (Echocardiography)	25	23.6

5.3 Frequency Of Comorbidities in Rheumatoid Arthritis

Various comorbidities were seen in patients with rheumatoid arthritis. Patient data was revised for BP, height and weight measurement, Hemoglobin A1c and fasting blood sugar, lipid panel, Echocardiography, HBsAg, and HCV antibody for Hypertension, Obesity, Diabetes mellitus, Dyslipidemia, Cardiac diseases, HBV infection, and HCV infection throughout their follow up. Of these, forty-two (40.8%) had comorbidities out of which 21 (20.3%) had one comorbidity, 7 (6.8%) had two comorbidities, 9 (8.7%) had three comorbidities, 4 (3.8%) had four comorbidities, and 1 (0.98%) patient had five comorbidities (Table 4).

Table 4 Prevalence of Comorbidities in RA among patients who visited Rheumatology outpatient clinic at SPHMMC, Addis Ababa, Ethiopia from February 2022 to July 2022.

Comorbidities n=42	Frequency (n)	Percent (%)
Hypertension	29	28.2
Dyslipidemia (on treatment)	16	15.5
Dyslipidemia (total)	23	22.3
Diabetes Mellitus	8	10.1
Cardiac disease (Echo abnormalities)	Normal Abnormal	14 11
Total cholesterol	High (≥ 240 mg/dl) Normal Not determined	3 33 51
Triglyceride level	High (≥ 130 mg/dl) Normal Not determined	5 31 51
		28.2 37.9 58.6 5.7 35.6 58.6

HDL	Low (≤ 40 mg/dl)	2	2.3
	Normal	34	39.1
	Not determined	51	58.6
LDL	High (≥ 190 mg/dl)	1	1.2
	Normal	35	40.2
	Not determined	51	58.6
Treatment for TB after diagnosed with RA		3	2.9
HBV Infection		2	5.4
HCV infection		0	
Depression		4	3.9
Body mass index category	<18.5	3	2.9
	18.5 – 24.9	49	47.6
	25.0 - 29.9	42	40.8
	30.0 - 34.9	9	8.7

5.4 Disease Characteristics

Serologic positivity for rheumatoid factor was 73.8% (n=76). Anti-Cyclic Citrullinated Peptide (ACCP) was done only for 5 patients out of which 3 patients had positive result (figure 2).

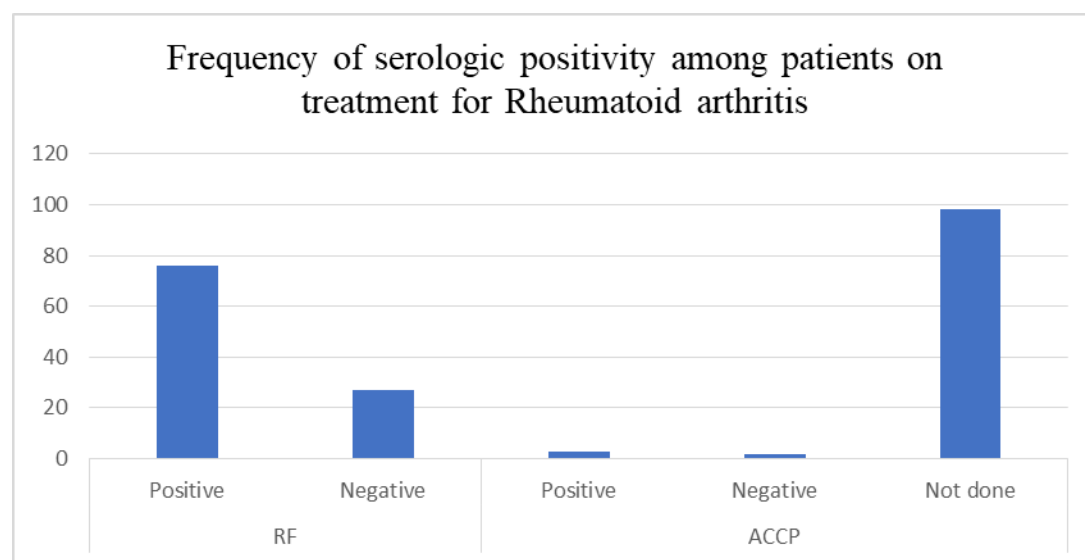


Figure2: Frequency of serologic positivity among patients who were on treatment for rheumatoid arthritis at rheumatology clinic, SPHMMC, Addis Ababa, Ethiopia from February 2022 to July 2022

Four-fifth (n=82, 79.6%) of patients were treated with DMARD. Among the patient who was treated with DMARD, majority (n=67, 81.7%) of the patients were treated with single DMARD

while 15 (18.3%) patients were treated with double DMARD. Methotrexate and/or Chloroquine were the DMARDs used for treatment. Methotrexate was the more frequently given and other treatment characteristics is depicted in the table below (Table 5).

Table5: Pattern of disease treatment characteristics of patients with rheumatoid arthritis who visited rheumatology clinic, SPHMMC, Addis Ababa, Ethiopia from February 2022 to July 2022.

Characteristics		Frequency (n)	Percent (%)
Duration of treatment	< 6 months	18	17.5
	6 months - 5 years	33	32
	>5 years - 10 years	51	49.5
	> 10 years	1	1
Mean ESR (Erythrocyte sedimentation rate)		33.48	
Treatment with NSAID	Yes	89	86.4
	No	14	13.6
Treatment with Steroid	Yes	77	74.8
	No	26	25.2
Steroid dose in mg	5	41	39.8
	7.5	1	1
	10	34	33
	>10	1	1
Treatment with DMARD	Yes	82	79.6
	No	21	20.4
Methotrexate	Yes	74	71.8
	No	8	7.8
Chloroquine	Yes	23	22.3
	No	59	57.3
Double DMARD	Yes	15	14.6
	No	67	65

6. DISCUSSIONS

This study aimed to determine the the disease characteristics of RA and prevalence of comorbidities cross-sectionally by reviewing 118 patient charts and 103 patients were included, and 15 patients were excluded according to exclusion criteria.

6.1. Characteristics Of Study Subjects

The age of patients in our study ranged from 15 years to 80 years with a mean age of 44.1(SD = 12.9) years, which is consistent with the Egyptian study by El-Zorkany et al. ⁴ , which was 47.5 (11.2) years, but the study in Ethiopia at BLH, by Becky A. et al.,²⁶ was younger than our study (36 (13) years). and also a South African cross-sectional study in 109 patients by S. Botha-Scheepers et al.⁷ showed the mean age was 57.6 years, and this discrepancy finding might be due to the limited number of patients and single-center studies. In our study, 81.6% were female, which is consistent across the previous studies; El-Zorkany et al.⁴ (85.1%), S. Botha-Scheepers et.al. ⁷ (85.6%), and Becky A. et.al. ²⁶ (90%).

In our study 44.7% of our patients were completed Secondary school and University level of education and comparable with Spanish cohort (46.5%) and greater than Korean patients which is only 39.3%. In this study 45.5% of our patients are currently employed while 29.2% and 35% in RA patients from Korean and Spanish patients were employed respectively, which might be due to the lower age of our patients^{18,21}.

6.2 Risk Factors

The most frequent identified known risk factors for rheumatoid arthritis was a history of periodontal disease, which was identified in twenty-seven (26.2%) patients which is lower than Potikuri et al. identified in 64.83% (59/91) ³¹ patients which also reproduced in many systemic reviews and meta-analysis studies ^{29,30}.

Six (5.8%) patients in our study had a cigarette smoking habit, which is comparable with the Egypt study by El-Zorkany et al. (7.1%) but, lower than all previous studies; in the Spanish cross-sectional study, smokers were 8.5%, whereas it was 11.5% in the Korean study, 20.8% in South Africa ²³ and 49.5% in another study by Botha-Scheepers et.al ⁷. This might be due to low community habit of smoking in Ethiopia (5% in the general population), and 1.8% in females ³⁶. but higher number of South Africans women were smokers (29.2%) ³⁷.

All rheumatoid arthritis patients were screened for hypertension and obesity, while 76.7% were screened for diabetes with hemoglobin A1c and/or FBS, and 50.5% were screened for dyslipidemia by a lipid panel, including those who began treatment. Lower number of patients were screened for dyslipidemia and diabetes when we compared to the guidelines³⁸ and also serologic screening for HBV and HCV was lower than BLH study (99% for each)²⁶; guidelines recommend that all patients be screened before commencement of steroids³⁹. This finding might be due to missed charts, lack of documentation, and lack of awareness of recent guidelines by the attending physician, but this needs further study.

6.3 Comorbidities

Various comorbidities were seen in previous studies, whereas the results were not consistent across the studies. In our studies Forty-two (40.8%) patients had comorbidities, out of which 21 (20.3%) had one comorbidity, 7 (6.8%) had two comorbidities, 9 (8.7%) had three comorbidities, 4 (3.8%) had four comorbidities, and 1 (0.98%) patient had five comorbidities, which is similar to an Indian study by S. Chandrashekara et al.²⁵ one, two, three and four comorbidities in 25.65%, 9.36%, 2.21%, and 0.44% respectively and lower prevalence than South African study by Botha-Scheepers et al. which showed one comorbidity in 69%, two in 40%, three in 26%, four in 13% and five in 2% of the patients⁷. This might be due to the shorter disease duration and younger age of our study population.

In our study the most common prevalent comorbidity was hypertension(28.2%), which is higher than the general prevalence of hypertension in Ethiopia (19.6%)⁴⁰ but consistent with the Egypt study by El-Zorkany et al.⁴ (25%), and lower than the study done by Chandrashekara et al.²⁵ (20.7%), which could be attributed to the younger age of our study population and the lower prevalence of hypertension seen in India⁴¹ (20%). Other studies, including Attar et al.¹¹ (35.9%), Balsa et al.¹⁸ (41%), Choi et al.²¹ (37.6%), and V.Lala²³ (70%), found a higher prevalence of hypertension than ours. This higher prevalence might be due to the older age of the study population, the type of medication they used, the longer duration of illness and treatment, which needs to be studied in the future.

The prevalence of dyslipidemia was the second most common comorbidity in our study (22.3%), which is consistent with previous studies by Attar et al.¹¹, which was 19.4%, and is

higher than previous South African studies by Botha-Scheepers et al. and an Indian study by Chandrashekara et al., which were 7.1% and 5.3%, respectively ^{7,25}. In other studies by V. Lala et al. and Balsa A. et al. dyslipidemia was found in 47.4% and 45.5% respectively ^{18,23}.

Diabetes mellitus was detected in 10.1% of our study population, which is consistent with previous studies by Balsa A. et al. (12%), El-Zorkany et al. (11.4%), Botha-Scheepers et al. (10.9%) and Chandrashekara et al. (14.4%), and this showed that RA patients have a higher prevalence of diabetes mellitus than the general population in Ethiopia (6.5%) ⁴².

Obesity was found in 8.7% of our study, which is higher than the general population which was 5.4% according to A. Kassie et al. ⁴² which is lower than Balsa et al. (26%). This is due to the high incidence of obesity in the Spanish population ⁴³.

Depression is found in 3.9% of our study and is comparable with a previous study by Choi et al. ²¹ found in 4% of RA patients. But other studies by El-Zorkany et al. (10.2%) and Duogados et al. ⁴⁴ (15.2%), showed a higher prevalence than our study. This might be due to poor screening and/or other factors which need further research.

In our study treated patients with tuberculosis was 2.9%, while infection with HBV was found in 2.7%, but Studies conducted in South Africa by Botha-Scheepers et al. and V. Lala et al. showed 11.1% and 10.6%, respectively, and similarly, Attar et al. showed in 7.4%. The higher prevalence of tuberculosis in those studies might be due to the larger number of DMARD and biologics given to their patients, while biologics was not prescribed in our study ^{7,11,23}. The prevalence of HBV infection among screened patients (35.9%) in our study was 5.4%, which is comparable with a previous study by Balsa et al. and Attar et al., 4.6% and 5.2%, respectively, but lower than the national prevalence of hepatitis B virus ⁴⁵ which is 7.4% this might be due to a lack of screening.

6.4 Disease Characteristics

Serum RF was positive in 73.8% of our study, which is comparable with the Saudi Arabian study ¹¹ (76.1%) but greater in two South African studies (85.1%), (91%)^{7,23}, and Indian ²⁵ (85.2%).

In our study, the disease duration in the majority of patients were between 6 years and 10 years (49.5%), and only one patient crosses 10years in our study, but Attar et al.¹¹ found 32.1% of patients were treated for more than 10 years indicating a longer duration of treatment than our study, which could be due to the late start of the service in our setup.

In our study, four-fifths (79.6%) of patients were treated with DMARD, 65% of the patients were treated with a single DMARD 14.6% of patients were treated with double DMARD, whereas more than dual DMARD and biologics were not used in our study. In a recent study by Attar et al.¹¹ 86.2% were treated with DMARD and 50.6%, 28.5%, 7% were used single, double, and triple DMARD, respectively. Across the previous study biologics were used between 1%-41.5%^{7,11,18,23,25}, the usage of DMARD was less in our study. This might be due to the younger age of our study, the disease activity, or the availability/cost of the drug, and this should be explained by further research.

Methotrexate and/or chloroquine were the DMARDs used for treatment in our study, and methotrexate was more frequently used DMARD than chloroquine (71.8% vs. 22.3%). This is comparable to the findings of Attar et al.¹¹ (74.4%), Botha-Sheepers⁷ (72%), and Balsa et al.¹⁸(74.5%). But in another study by El-Zorkany et al.⁴, Lala et al.²³ and Becky et al.^{1,26} methotrexate was prescribed in 94.5%, 95.4% and 97% respectively, which is higher than our studies, which might be due to the quality project done at BLH to increase the prescription trend of DMARD.

Chloroquine is the second most frequently prescribed medication in our study, which accounts for 22.3%, and Attar et al. found chloroquine was used in 32.3% and an Ethiopian study by Becky et al.²⁶ showed 40% of patients were on chloroquine at the time of the study, whereas Botha-Sheepers et al.⁷ found 67%, and similarly, another South African study by Lala et al.²³ showed 93% of patients were on chloroquine. Previous studies showed that chloroquine is used more than in our study, and the reason might be due to disease activity, comorbidity, or availability of the drugs.

In our study, 86.2% of patients used NSAIDs in the past three months, which is similar to what Choi et al.²¹ found to be 81.03% of patients on NSAIDs, and a lower number of patients were

prescribed in other studies.^{4,11,18}, which is consistent with the guidelines²⁴, which recommend using NSAIDs sparingly and in the lowest possible doses, but Lala et al.²³ discovered NSAID usage in 98.8% of their patients, which is higher than our patients and may be due to the aging of the study population, as well as longer disease duration and comorbidities.

Prednisolone prescriptions in our study showed 74.8% with a high dose prescription (>10mg) 34%. In a Korean study, according to Choi et al.²¹ the usage of prednisolone was 73.9%, which is comparable with our study, whereas prednisolone was used less in previous studies according to El-Zorkany et al.⁴ (58.4%), Botha-Scheepers et al.⁷ (47%), and Balsa et al.¹⁸ (52.5%) whereas the usage of prednisolone was higher in the Saudi Arabian study by Attar et al.¹¹ (80.8%). Similarly, another South African study by V. Lala et al.²³ and an Ethiopian study by Becky et al.²⁶ showed 85.8% and 92% used prednisolone, which is higher than our findings and this might be due to the unavailability of other DMARDs.

7. LIMITATIONS

- The study was conducted only at a single center and the total patients were relatively low and possibly this could exaggerate/undermine the result of comorbidity.
- Since all patients were not screened for comorbidities, we cannot make generalizations based on it.
- Patients recall bias and incompleteness of the chart. And we tried to solve incompleteness of the charts for some of our variable by taking BP measurements for those who are not on treatment for hypertension, weight and height of patients during clinic visits and by making smoking history, history of depression and family history of similar illness as a primary data.

8. CONCLUSION

In our study, hypertension was the most common prevalent comorbidities in RA followed by dyslipidemia and diabetes consecutively and prevalence of tuberculosis and depression were lower in our study. The screening for dyslipidemia, diabetes and serology for HCV and HBV were insufficient. Most of the patients are on single DMARD, while biologics was not used and periodontal disease was found in quarter of our study group.

9. RECOMMENDATIONS

We recommend Internal medicine department, screening of the patient for Atherosclerotic CVD should done yearly with FBS/HgA1c, BP, Lipid profile as per guideline recommendations and HBV and HCV should be done before commencement of the treatment.

We recommend SPHMMC, to facilitate multidisciplinary approach to manage RA patients so that appropriate screening and treatment can be given for comorbidities before commencement of immunotherapy.

We recommend MOH, multicentric, prospective studies to know the prevalence of comorbidities and disease characteristics of Ethiopian RA patients as this study indicates significant.

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ANNEXES

Annex 1- The written consent form

Title: PREVALENCE OF COMORBIDITIES IN RHEUMATOID ARTHRITIS AND ASSOCIATED RISK FACTORS AT SAINT PAUL’S HOSPITAL MILLENNIUM MEDICAL COLLEGE, ADDIS ABABA, ETHIOPIA, A PROSPECTIVE STUDY.

Investigator: Hundaol Shiferaw, M.D., Internal medicine department, SPHMMC

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Introduction:

Greetings, you are being asked to participate in a study of prevalence of comorbidities in rheumatoid arthritis and associated risk factors in the SPMMC Rheumatology unit. You were selected because you are on follow-up on the selected time frame of the study and you have received a required diagnosis.

Please listen carefully and feel free to ask any questions you may have to the investigator.

Purpose of the study: to evaluate the prevalence of comorbidities in rheumatoid arthritis and associated risk factors in patients.

Procedure: If you agree to this study, you will be asked questions including basic things about you and there will be additional blood test and Imaging for the comorbidities under study.

Risks: there is no anticipated risk of participation and acceptance or refusal will not affect any further care.

Benefits: It will help us to know the burden of of comorbidities and associated risk factors and will guide us to treat accordingly.

Confidentiality: The study will be anonymous, findings will be strictly confidential, and your identification will not be mentioned. All information will be kept in a password protected computer.

Payment: You will not receive any payment for your participation except gratitude.

Right to refuse or withdraw: You may refuse any time to participate in the study and can withdraw your consent for the data gathered to be used.

Annex 2: Semi-structured data collecting checklist

Date -----

Card number -----

PART I. Baseline characteristics

S. R	Question	Response category
1.	Age (in years)	
2.	Sex	1. Male 2. Female
3.	Smoking status/History	1. Active Smoker 2. Previous smoker 3. Non-smoker
4.	Family history of RA?	1. Yes 2. No
5.	History of diagnosed periodontal disease?	1. Yes 2. No
6.	Any psychiatry visit/ physician diagnosis of depression?	1. Yes 2. No
7.	History of TB treatment?	1. Yes 2. No

Part II. Vital signs, Laboratory and Imaging measurements: please circle the result

No	Biochemical indices	Result
8.	BMI (Kg/m ²)	A. <18.5
		B. 18.5- 24.9
		C. 25 – 29.9
		D. >29.9
9.	On management of HTN?	A. Yes B. No
10.	BP (mm/Hg)	A. ≤ 120/80
		B. 120/80 – 140/90
		C. ≥ 140/90
11.	HBV	A. Negative B. Positive
12.	HCV	A. Negative B. Positive

13.	On management of dyslipidemia	C. Yes D. No
14.	A. T. Cholesterol (mg/dl)	A. ≥ 240 B. < 200
	B. Triglyceride(mg/dl)	A. ≥ 130
		B. < 130
	C. HDL (mg/dl)	A. ≤ 40
		B. > 40

የፍቃድ መጠየቅያ ቅጽ

ርዕስ:- በሩማቶይድ አርትራይተስ ታካሚዎች ላይ ያሉ ተጓዳኝ በሽታዎች እና ተያያዥ የህመሙ

መንስኤዎች በቅዱስ ጳውሎስ ሆስፒታል ሚሊኒየም የህክምና ኮሌጅ፣ አዲስ አበባ፣ ኢትዮጵያ፣

መርማሪ፡ ዶ/ር ፣ ሁንዳኦል ሽፈራው፣ የውስጥ ደዌ ህክምና ሬዝደንት

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መግቢያ:-

በ ቅ/ጳ/ሚ/ሜ/ኮ የውስጥ ደዌ ህክምና ክፍል ሩማቶሎጂ ንዑስ ክፍል በሩማቶይድ አርትራይተስ ላይ ያሉ ተጓዳኝ በሽታዎች ስርጭት እና ተያያዥ የህመሙ መንስኤዎች የሚል ጥናት ላይ እንዲሳተፉ እንጠይቃለን። እርስዎ የተመረጡት በጥናቱ በተመረጠው የጊዜ ገደብ ክትትል ላይ ስለሆኑ እና አስፈላጊውን ምርመራ ስላደረጉ ነው። እባክዎን በጥሞና ያዳምጡ እና የሚፈልጓቸውን ጥያቄዎች መርማሪውን የመጠየቅ መብት አሉዎት።

የጥናቱ ዓላማ፡ በሩማቶይድ አርትራይተስ ውስጥ ያሉ ተጓዳኝ በሽታዎች ስርጭት እና በታካሚዎች ላይ ተያያዥነት ያላቸው የአደጋ መንስኤዎችን ለመገምገም ነው።

የአሰራር ሂደት፡ በዚህ ጥናት ከተስማሙ ስለእርስዎ መሰረታዊ ነገሮችን ጥያቄዎች ይጠየቃሉ እና የተደረጉ የደም ምርመራና የልብ አልትራሳውንድ ከከርዶት ላይ ይወሰዳሉ።

ስጋቶች፡ በተሳትፎ ምንም አይነት የሚጠበቅ አደጋ የለም እና መቀበል ወይም እምቢ ማለት ተጨማሪ እንክብካቤን አይጎዳውም።

ጥቅማጥቅሞች፡- የተጓዳኝ በሽታዎችን እና ተያያዥ የአደጋ መንስኤዎችን መጠን ለማወቅ ይረዳናል እናም ይህንንም ማወቅ ተገቢውን ህክምና እንድንሰጥ ይረዳናል።

ምስጢራዊነት፡ ጥናቱ ማንነትን የማይገልጽ ና ግኝቶቹ በጥብቅ ሚስጥራዊ ይሆናሉ፣ እና መታወቂያዎ አይጠቀስም። ሁሉም መረጃዎች በይላፍ ቃል በተጠበቀ ኮምፒውተር ውስጥ ይቀመጣሉ።

ክፍያ፡- ከምስጋና በስተቀር ለተሳትፎ ምንም አይነት ክፍያ አይቀበሉም።

እምቢ የማለት ወይም የመውጣት መብት፡ በጥናቱ ለመሳተፍ በማንኛውም ጊዜ እምቢ ማለት ትችላላችሁ እና የተሰበሰበው መረጃ ጥቅም ላይ እንዲውል የሰጡትን ስምምነት ማንሳት ይችላሉ።

የመረጃ መሰብሰቢያ ዝርዝር ክፍል

ቀን ----- የካርድ ቁጥር -----

ተ.ቁ	ጥያቄ	ምላሽ ምድብ	
1)	ዕድሜ (በአመት)		
2)	ጾታ	ወንድ	ሴት
3)	ስራ	ሀ) የግል ሐ) የሌለው	ለ) የመንግስት
4)	የ ትምህርት ደረጃ	ሀ) የተወሰነ የመጀመርያ ደረጃ ትምህርት ለ) የመጀመርያ ደረጃ ትምህርት ያጠናቀቀ/ች ሐ) የተወሰነ የሁለተኛ ደረጃ ትምህርት	መ) የሁለተኛ ደረጃ ትምህርት ያጠናቀቀ/ች ሠ) የመጀመርያ ዲግሪ ረ) የሁለተኛ ዲግሪ እና ከዛ በላይ
5)	የወር ገቢ በአማካይ ____		
6)	ሲጋራ ያጭሳሉ?	አዎ	አይ
7)	በሩማቶይድ የተጠቃ የቤተሰብ አባል አለዎት?	አዎ	አይ
8)	ሮማቶይድ ከመታመሞት በፊት የጥርስ ና ድድ ኢንፌክሽን ህመም ታክመው ያውቃሉ?	አዎ	አይ
9)	በ ዐዕምሮ ሐኪም የመንፈስ ጭንቀት ህመም አለበት ተብሎ ያውቃሉ።?	አዎ	አይ
10)	አዎ ከሆነ ህክምና እየተከታተሉ ነው	አዎ	አይ
11)	የሮማቶይድ ህክምና መውሰድ ከጀመሩ በኋላ የቲቢ ህመም ታክመው ያውቃሉ?	አዎ	አይ

Part II. Vital signs, Laboratory and Imaging measurements: please circle the result

No	Variables	Result			
15.	BMI (Kg/m ²)	A. <18.5			
	Weight _____	B. 18.5- 24.9			
	Height _____	C. 25 - 29.9			
		D. ≥30			
16.	BP (mm/Hg)	A. <140/90			
		B. ≥ 140/90			
17.	HBV	A. Negative	B. Positive	C. Not done	
18.	HCV	A. Negative	B. Positive	C. Not done	
19.	ESR				
20.	Serology	A. RF	Positive	Negative	Not done
		B. ACCP	Positive	Negative	Not done
21.	On management of HTN?	A. Yes		B. No	
22.	On management of DM?	A. Yes		B. No	
23.	On management of dyslipidemia?	A. Yes		B. No	
24.	D. T. Cholesterol (mg/dl)	C. ≥ 240		D. < 240	
	E. Triglyceride(mg/dl)	C. ≥ 130		D. < 130	
	F. HDL (mg/dl)	C. ≤ 40		D. > 40	
	G. LDL (mg/dl)	A. ≥ 190		B. < 190	
25.	FBS	A. <126 mg/dl			
		B. ≥126 mg/dl			
26.	Echo finding	A. Normal			
		B. Abnormal			

Part III. Disease characteristics

No.	Characteristics				
1.	Disease Duration	A. <6 months		B. 6 months-5 years	
		C. >5 - 10 years		D. >10 years	
2.	Type of therapy (specify)	A. NSAID	B. Steroid	C. DMARD	D. bDMARD
3.	If steroid	A. Dose _____			
	Type of DMARD	A. Methotrexate	B. Chloroquine	C. Other, if other specify- _____	

Annex 3: Declaration

I the undersigned resident declare that this thesis is my original work in partial fulfillment of the requirement for certificate of specialty in internal medicine. I also declare that it has never been presented in this or any other higher institution and all the resources and materials used in the research work have been duly acknowledged

Name of the Resident: _____

Signature: _____

Date: _____

Approval of Advisors

The research work has been submitted for examination with my approval

Name of Clinical Advisor: _____

Signature: _____

Date: _____

Name of Public Health Advisor: _____

Signature: _____

Date: _____